



# 2014 ALR Annual Conference

## CONCURRENT PRESENTATION ABSTRACTS

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### **From the Ground Up: Active Design as a Tool for Communities in NYC**

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**Focus Area:** Practice/Policy

#### **Background and Purpose**

In 2010, New York City (NYC) agencies created the Active Design Guidelines, outlining urban and building design strategies for creating environments that promote daily physical activity. The Guidelines serve as a resource to designers, architects, planners, developers and policy makers. Since 2010, over 2,000 design professionals have been trained on the Guidelines, over 15,000 copies have been distributed and several Active Design policies have been advanced in NYC.

Through this work, we recognized that input and strong demand and support from communities is critical for further advancements in, and utilization and ownership of, Active Design strategies.

This presentation will highlight two components of community engagement work in NYC to improve built environments for active living: interactive workshops and NYC's Active Design Guide for Community Groups.

#### **Description**

To build community demand and support for Active Design and in recognition that community members are the experts on the facilitators and barriers to healthy living in their communities, the NYC Department of Health and Mental Hygiene (DOHMH) developed a plan for Active Design community engagement work in 2012.

Partnering with organizations such as Bedford Stuyvesant Restoration Development Corporation, Bronx Health REACH and Mount Sinai School of Medicine, over 25 interactive workshops reached over 500 participants in communities throughout NYC, with a focus on lower-income communities with high rates of obesity.

These workshops had 4 objectives: 1) educate participants about the links between the built environment and active living, 2) provide information about how to access resources that communities can utilize to make communities healthier, 3) provide a venue for residents to collaboratively envision a healthier built environment, and 4) create a space for DOHMH and partners to learn about facilitators and barriers to healthy living from the community's perspective in order to help us prioritize our efforts.

Several built environment ideas generated at the workshops were implemented: students created and installed art pieces above water fountains to encourage drinking tap water at a high school in Manhattan, using a community design process, a playground was constructed at a low-income housing development in Brooklyn, and a vibrant community Play Street was held in the Bronx. Larger community led efforts underway as a result of this work include improving bicycle access on a commuter ferry and expansion of NYC's bicycle share program into neighborhoods where there are currently no plans to implement.

Through these collaborations, we collectively recognized the need for a tool for community groups that outlines the evidence for the health, economic and social benefits of Active Design and the resources available to implement projects that improve the built environment. Thus, we released the Active Design Guide for Community Groups in August 2013, created with input from community partners and other City



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agencies. The five content areas addressed in the guide are: Active Transportation, Active Recreation, Active Buildings, Green Space and Nature, and Healthy Foods and Beverages. In each section, we describe how the built environment can promote routine physical activity, such as playing, walking and bicycling, in addition to how Active Design can promote other areas of physical and mental health and social and economic vitality and environmental sustainability. Resources for incorporating active design into neighborhoods, streets and buildings are catalogued. Lastly, the “Making the Case” section describes how to access and use data to build support for projects among residents, community partners and local officials.

### **Lessons Learned**

The workshops, and interventions borne out of the workshops, demonstrated that community members are aware of many of the barriers to healthy living, and have creative ideas for improving their communities. However, many community groups are unaware of resources available to make these changes in their communities. We also learned of several barriers to active living whose importance we did not previously recognize, including sanitation conditions such as rat activity, litter and dog waste, and lighting and other built environment factors impacting crime and perceived safety. Learning what communities perceived to be the most important barriers to active living has helped DOHMH and community partners prioritize our efforts.

### **Conclusions and Implications**

We need to ensure resources that support active living are reaching the highest need neighborhoods. DOHMH and partners need to continue to collaborate to maximize our complementary strengths to identify and address barriers to active living in the communities of highest need.

### **Next Steps**

We will continue community outreach and will widely disseminate the Community Guide to ensure that NYC communities are aware of the programs and resources available. Evaluations of the water fountain art installation and the Play Street in the Bronx are both underway. We will continue to evaluate these and other built environment work being undertaken, including processes, costs, and physical activity outcomes and will disseminate results in NYC and elsewhere.

Finally, we will take what we have learned from community engagement to inform policy and citywide efforts in partnership with other City agencies and community groups.

### **References**

1. NYC Active Design Guidelines ([www.nyc.gov/adg](http://www.nyc.gov/adg))
2. Active Design Guide for Community Groups (<http://www.nyc.gov/html/doh/downloads/pdf/environmental/active-design-community-guide.pdf>)
3. Active Design: Affordable Designs for Affordable Housing <http://activelivingresearch.org/active-design-supplement-affordable-designs-affordable-housing>

### **Support / Funding Source**

Centers for Disease Control and Prevention Community Transformation Grant



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## **When Prevention Gets Attention: News Analysis and Communications Training for The Minnesota Statewide Health Improvement Program**

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<sup>1</sup>*Berkeley Media Studies Group*

**Focus Area:** Practice/Policy

### **Background and Purpose**

In 2008, the Minnesota state Legislature passed a ground-breaking health reform law that included a provision to address the root causes of poor health with the aim of reducing quickly rising health care costs. The program, known as SHIP, the Statewide Health Improvement Program, began funding grants to support local community prevention across the state in 2009. Their focus would be on increasing active living and improving nutrition throughout Minnesota.

While the projects were extremely popular in the communities in which they were funded, some members of the legislature questioned the ability of a prevention-oriented initiative like SHIP to cut costs and threatened to not renew the Program's budget.

SHIP administrators wanted to know how SHIP, and the prevention approach that drives it, were covered in Minnesota news. What was said, and left unsaid, in these public conversations.

In tandem with the content analysis, SHIP leaders also wanted to provide strategic communications skills to community partners to improve the way program staff talked about their work. SHIP asked Berkeley Media Studies Group (BMSG) to provide training to program staff on the lessons learned in the content analysis and on message development and delivery. The training also addressed why the findings of the content analysis matter and what communications skills would help SHIP representatives develop to bolster future discussions the importance of this program.

This presentation will discuss how other prevention programs can learn from the content analysis and media advocacy trainings provided to the Minnesota SHIP program.

### **Description**

BMSG examined news coverage of the SHIP initiative. The goal was to understand how active living and nutrition issues and the SHIP program were portrayed in the news. This information is important because the news plays a key role in setting the agenda and framing public policy debates, and can influence the financial and programmatic success of public health programming.

BMSG also surveyed the communications skills and messages used by SHIP grantees to determine the strengths and weaknesses in their current prevention messages. Based on the news content analyses and the skill and message assessment, BMSG provided recommendations to the Minnesota Department of Public Health about how local grantees and the State Department of Health can best frame prevention in the given news context. BMSG delivered a series of regional trainings to SHIP grantees and to key Minnesota Health Department staff to help them learn more effective ways of talking about prevention.

### **Lessons Learned**

News coverage is an important component of communicating to policymakers and the public the benefit of SHIP's investments, and the need to fund them. In the in-depth coverage, news stories discussed SHIP's work across the three core public health issues addressed by the initiative: increasing physical activity and improving nutrition and reducing tobacco use and exposure.



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The most prominent theme in SHIP news coverage articulated the future benefits that the program would bring to Minnesota, primarily about how SHIP will bring about important health policy changes to Minnesota, will improve Minnesotans' health, and will produce healthcare cost savings.

Though future benefits are important, it is critical for policymakers to see the present benefits as well. As such, BMSG believes that framing prevention programs in terms of present benefits would be helpful in explaining prevention programs' importance during periods of intense competition for scarce resources. We also believe that efforts to quantify the policies and programs put in place, and share the powerful stories of youth and adults who benefit from the programs can be valuable pieces of the public narrative to build support for prevention programs. Broadening the voices represented in news coverage can put prevention program allies in a better position to tout the program's current achievements. Such voices can praise government's role while not representing the state. Building media advocacy skills can help local residents and program staff maximize opportunities to highlight the many successes the program has already achieved.

### **Conclusions and Implications**

The way advocates talk about the work they do on the ground is critical for continued support of the work itself. Understanding the power of the media as a vehicle for information is critical to bolster community change efforts. It is also crucial for advocates to be trained in how to develop and deliver strong messages to people in positions of power to create change and continue support for successful programs.

Through this project, SHIP community partners were able to glean essential information and critical skills to make the case for their work moving forward.

### **Next Steps**

The SHIP program was refunded for another year to create healthier communities around the state. The messaging lessons learned through the media content analysis and the in-person communications trainings will be of continued value as this important work moves forward. We encourage SHIP communications leadership to pass along the important lessons learned to continue this important work.

### **References**

1. News for a Change, Lawrence Wallack et al. Sage Publications.
2. Media Advocacy and Public Health, Lawrence Wallack et al. Sage Publications.

### **Support / Funding Source**

This project was funded by the Minnesota Department of Health, Statewide Health Improvement Program.



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## Planning for Active Living and Resilient Communities: Moving Towards a New Norm

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**Focus Area:** Research

### Background and Purpose

Bicycle and pedestrian plans have been recognized as tools for promoting active living by encouraging supportive infrastructure improvements and community design. These plans may also help raise awareness about the synergies between active living and social goals, including increasing equity and access to resources, promoting more sustainable development patterns, improving neighborhood aesthetics, protecting the environment, facilitating adaptation to climate change, and supporting local economic development. These co-benefits, along with supportive governance structures, are considered important within collaborative movements to create “Resilient Cities” (1-7). However, little is known about the extent to which bicycle and pedestrian plan content aligns with the emerging resilience planning movement (3).

### Objectives

Our primary objective was to investigate whether content pertaining to four resilience domains (cross-sector collaboration; consideration of co-benefits; governance; and equity) was reflected in North Carolina (NC) municipal bicycle and pedestrian plans. Additionally, we explored: (a) whether municipal sociodemographics were associated with resilience domains; and (b) whether specific plan content elements pertaining to stakeholder involvement were associated with resilience domains.

### Methods

Bicycle and pedestrian plans were identified through web searches, a listserv request to NC planners, a library at NC Department of Transportation, and follow-up communications. NC bicycle (n=25) and pedestrian (n=60) plans were content-analyzed using a previously developed plan quality coding protocol. All plans were double coded; discrepancies were resolved by consensus. Combined bicycle/pedestrian plans (n=9) and older versions of revised plans were not analyzed. Sociodemographic indicators from the U.S. Census (e.g., percent of the population living in poverty, median population age, percent  $\geq$  high school education, and racial composition) were collected for each municipality and merged with plan content information.

We created a ‘crosswalk’ tool that linked plan quality elements to the four resilience domains. For example, documentation of the involvement of a variety of stakeholder groups in plan development contributed to the ‘cross-sector collaboration’ domain; documentation of diverse goals contributed to the ‘co-benefits’ domain; documentation of specific policies, procedures, and implementation elements contributed to the ‘governance’ domain; and plan content pertaining to social justice and vulnerable populations contributed to the ‘equity’ domain. Table 1 relates these to interdisciplinary conceptualizations of resilience.

Resilience scores, comprised of the weighted mean of content elements pertaining to each domain, were derived such that each domain score ranged from 0 (weakest) to 1 (strongest). Descriptive statistics, Pearson correlations, and linear regression analyses were used to assess relationships between specific plan content elements, sociodemographics, and resilience scores.

### Results

Overall, resilience domains were weakly reflected in NC bicycle and pedestrian plans (governance score mean (m)=0.49 (standard deviation (sd) 0.09); co-benefits m=0.43 (sd 0.13); cross-sector collaboration



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$m=0.38$  (sd 0.16); and equity  $m=0.21$ (sd 0.12)). Scores did not differ substantially by plan type (pedestrian vs. bicycle), with the exception of co-benefits, which were more frequently documented in pedestrian plans ( $m=0.45$  (sd 0.12)) than bicycle plans ( $m=0.37$ (sd 0.12)).

Although equity scores were low overall, higher equity scores were correlated with cross-sector collaboration ( $r=0.23$ ,  $p<0.04$ ) and governance ( $r=0.35$ ,  $p=0.001$ ) scores. Policies that promote pedestrian-friendly land development were correlated with higher equity ( $r=0.25$ ,  $p=0.02$ ) scores.

Higher governance scores were correlated with higher co-benefit scores ( $r=0.41$ ,  $p<.0001$ ). Greater cross-sector collaboration was positively correlated with “promoting transportation-related physical activity” as a goal ( $r=0.24$ ,  $p=0.03$ ), and marginally associated with promoting general public health goals ( $r=0.21$ ;  $p=0.06$ ).

Sociodemographics were generally not correlated with resilience scores, with the exception of younger age being correlated with higher co-benefits ( $r=0.24$  ( $p=0.03$ ) and governance ( $r=0.27$  ( $p=0.01$ )) scores.

After controlling for sociodemographics, certain content elements were predictive of higher resilience scores. For example, higher co-benefit scores were associated with having Parks and Recreation staff ( $\beta=0.07$ ;  $p=0.03$ ) and land use planners ( $\beta=0.08$ ;  $p=0.04$ ) involved in developing the plan. Having a steering committee/advisory board comprised of citizens and public officials was associated with higher governance scores for all plans ( $\beta=0.16$ ,  $p<0.001$ ), and with higher co-benefits scores for bicycle plans ( $\beta=0.29$ ,  $p=0.04$ ), but not for pedestrian plans. Involvement of community-based organizations was associated with higher equity scores ( $\beta =0.10$ ,  $p=0.02$ ).

### Conclusions

These findings suggest that NC bicycle and pedestrian plans may be under-utilized in terms of their potential to promote integration of evidence-based active living content with elements supportive of resilient communities. Resilience planning is an emerging planning paradigm that can serve as a springboard for creating a ‘new norm’ and identifying opportunities for richer dialogue at the interface of collaborative planning initiatives.

### Implications for Practice and Policy

Resilience requires the ability to adapt not only to large-scale perturbations and disasters, but also to slow changes, aligning with a chronic disease prevention orientation. Although considerable progress has been made in forging connections between public health professionals, urban planners, and other disciplines to promote active living, an opportunity exists to explore resilience planning as a process through which to raise awareness about co-benefits, strengthen commitments to equity, and broaden the active living agenda.

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### Support / Funding Source

This work was supported by grants from RWJF Active Living Research.

Resilience Conceptualizations <sup>1</sup>	Focus	Planning Functions	Content Reflected in Bike/Pedestrian Plans
Engineering/built environment resilience	Recovery, constancy, predictability	<p>Planning functions to return the system to the "status quo" or steady state after a disturbance.</p> <p>Focuses on building infrastructure to protect the system from threats; assumptions are that we can predict future threats and prepare for them using the tools of technology and engineering.</p> <p>Planning functions as a mechanism to direct infrastructure investments.</p>	<p>Content focused on the development, design, and maintenance of bicycle/pedestrian infrastructure.</p> <p>Emphasizes physical design and transportation system flow.</p>
Ecological/ecosystem	Robustness; development of a "new normal"	<p>Planning functions to enable a system to adapt to a new equilibrium state or a 'new normal'.</p> <p>Historically focused on natural ecosystems more than social systems; assumes that people can agree on what a 'new normal' could or should be.</p>	<p>Content focused on integrating physical infrastructure (built environment) with the social dimensions related to active living (e.g., safety, health promotion, active travel).</p> <p>Emphasizes connections between the built environment and health-related social benefits (e.g., quality of life, disease prevention, improved mental health, access to health promoting resources).</p>
Social-ecological resilience	Adaptive capacity; transformability; learning and innovation; integrated system feedback, cross-scale dynamic interactions	<p>Planning functions to enhance adaptive capacity by providing a forum for communities to develop governance structures enabling self-organization; consideration of dynamic interactions across multiple scales and timeframes.</p> <p>Draws from integrated planning theory (e.g., rational, communicative, interpretive,</p>	<p>Content focused on integrating physical, social, environmental, and economic dimensions (e.g., various types of 'capitals' (social, political, etc.); content related to co-benefits and cross-sectoral collaboration.</p> <p>Content pertaining to governance, institutional structures, policy, power and</p>

<sup>1</sup> Adapted from Davoudi, 2012; Armitage 2012; Stokols 2013



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		equity/advocacy traditions) to meet the needs of a specific social context while recognizing inherent change.	equity issues, deliberative factors, and valuation.
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## **E-valuation: Creating Value Frameworks for Active Living Strategies**

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<sup>1</sup>Transtria LLC

**Focus Area:** Practice/Policy

### **Background and Purpose**

Obesity rates have tripled over the last three decades among U.S. children and adolescents, rising to 17% by 2009-2010.<sup>1-3</sup> In response, the Robert Wood Johnson Foundation (RWJF) created a national program, Healthy Kids, Healthy Communities (HKHC), designed to support 49 communities throughout the United States and Puerto Rico in implementing healthy eating and active living policy, system, and environmental changes. This initiative placed emphasis on reaching children who are at highest risk for obesity on the basis of race/ethnicity, income and/or geographic location. The evaluation of the communities combines participatory and evaluation methods, tools, and resources to document practical considerations for adopting, implementing, and sustaining system, policy, and environmental initiatives as well as to assess the impact. Value frameworks were created as part of the HKHC evaluation to document and describe the value of common childhood obesity prevention strategies. These frameworks were designed to help communities translate the value of their work to advocates, policy- and decision-makers, practitioners, and community residents and prepare communities for implementation of the strategies in an effort to revitalize and sustain these initiatives into the future.

### **Description**

Value frameworks were created for three commonly implemented active living strategies: childcare physical activity standards, active transportation, and parks and play spaces. For each strategy, data was collected through policy and cost interviews with leaders, partners, and/or community residents involved with day-to-day implementation of the active living strategies. In addition, the evaluation team incorporated knowledge from an evidence review project,<sup>4</sup> a committee to assess cost-effectiveness,<sup>5</sup> and an integrated framework for assessing the value of community-based prevention.<sup>6</sup> Value was summarized at four ecological levels: individual, organizational/agency, community, and societal through a comprehensive understanding of inputs (i.e., investments/resources, economic/financial investments, and social/environmental resources) and outcomes (i.e., costs/savings and benefits/harms) at each ecologic level. The assessment of value takes into context the available investments and resources (inputs) as well as the costs and savings associated with planning, implementing, and maintaining the strategy and potential benefits or harms as a result (outcomes).

### **Lessons Learned**

From 49 HKHC communities, 9 (18%) were implementing child care physical activity strategies, 30 (61%) active transportation strategies, and 29 (59%) parks and play space strategies. Within child care physical activity standards (defined as a policy/practice or environment change that takes place in public or private child care settings to increase moderate and vigorous levels of physical activity), both implementation efforts (e.g., advocacy and organizing, policy development, and/or policy implementation and enforcement activities) and potential impacts (e.g., policies, environments and services, and/or populations) are considered. Examples of inputs and outcomes for child care physical activity standards are illustrated in figure 1. As an individual investment, parents and guardians contribute financially to support a child care facility and pay for oversight and education of their children. Agency/organizational level resources may include donated meeting space or equipment suitable for training staff. Community-level costs/savings include those related to local committee and taskforce meetings that recommend policy changes related to physical activity standards in child care settings to elected or appointed officials. Societal-level benefits and harms include incorporating minimum levels of physical activity into the daily



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schedule of young children can produce healthier adolescents and adults and increase equity of physical activity opportunities across the system, regardless of income level or social demographics.

### **Conclusions and Implications**

The value frameworks provide a novel rubric for presenting how active living strategies impact individuals, organizations, communities, and societies. These value frameworks represent an initial effort to respond to the demand for resources that can be used by communities to express the value of their childhood obesity prevention efforts. The frameworks were designed to be customized for different community contexts in order to identify the range of inputs and impacts associated with local childhood obesity prevention strategies.

### **Next Steps**

In evaluation, customized value frameworks can be used by communities to develop measures of strategy dose and impact. In collaboration with economists, communities may assign monetary values to some or all of these measures to weigh and summarize the overall value of the prevention strategies. These efforts bring communities another step closer to engaging in value-based decision-making for childhood obesity prevention. Additionally, the frameworks introduce the longer-term effects of social determinants of health into the “cost” and “value” inputs and outputs, encouraging investigation into health disparities and inequities that interfere with positive, sustainable outcomes. Further research needs to be done to quantify the value frameworks to further the benefit-cost analysis for policy, system, and environmental approaches to reducing childhood obesity. Additionally, creating methods and process to measure each level of value will move us closer to demonstrating the impact of childhood obesity prevention strategies. Moving forward, the use of value frameworks will enable practitioners to plan and prepare for advocacy initiatives; policy adoption, implementation, enforcement, and sustainability efforts; and changes to the built environment for healthy communities.

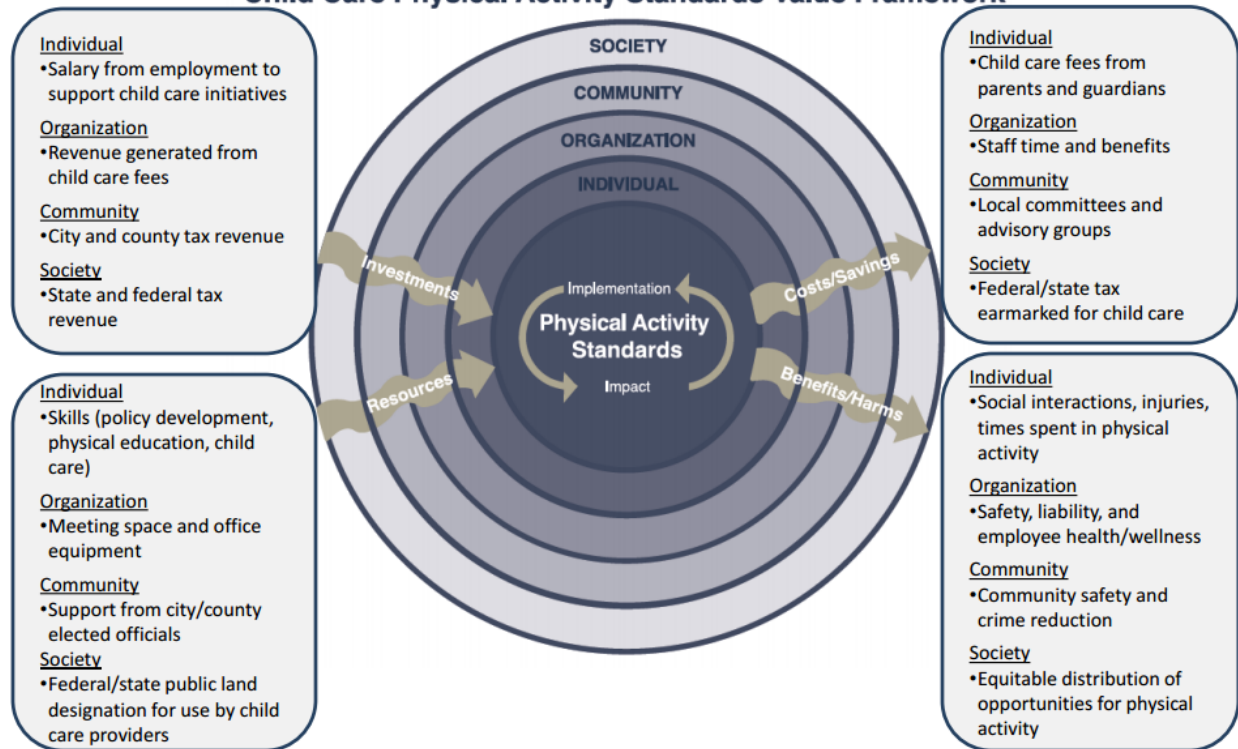
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### **Support / Funding Source**

Support for the Evaluation of Healthy Kids, Healthy Communities came from the Robert Wood Johnson Foundation grant #67099.

**Figure 1:**  
**Child Care Physical Activity Standards Value Framework**





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### **Park Prescriptions in Practice: The Community Driven Way**

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**Focus Area:** Practice/Policy

#### **Background and Purpose**

Park prescriptions is a movement to strengthen the connection between health care and parks and public lands to improve the physical and mental health among individuals and communities. Park prescriptions offers an alternative to treating or preventing health problems that focuses less on traditional medicine and more on connecting with parks and nature to increase levels of physical activity and reduce levels of stress. The movement has quickly grown from a conceptual phase into a period of rapid implementation with programs being developed across the country. The sustainability of the movement will require that we solve the operational hurdles present in parks and health collaborations, and that we hone and measure the best delivery models currently in practice.

We hope you can join us and other leaders representing parks and health to refine on-the-ground tactics for program development, program delivery, measurement, and professional training around park prescriptions. While numerous park prescription programs exist at the local and state levels, little has been done to collect successful strategies and share them with other communities looking to implement similar models. Furthermore, programs that do exist each look different from one another, which raises a concern that agencies are “reinventing the wheel” as opposed to learning and building from successes.

#### **Description**

The Institute at the Golden Gate, the National Recreation and Park Association, and the Centers for Disease Control and Prevention are partnering to elevate park prescriptions and related programs from a new idea to a best practice in preventive health. The partners are convening local, state, and national experts to evaluate and refine aspects of current park prescription programs. Program standards created from shared knowledge will increase the quality of new and existing programs as well as support more accurate evaluation of program impacts.

#### **Lessons Learned**

Together we are defining park prescriptions, gaining a better understanding of the national landscape, and identifying standardized measurement and data collection methods needed to determine the effectiveness of park prescriptions.

#### **Conclusions and Implications**

By taking best practices from park prescription programs around the country we are aligning our objectives to more easily measure areas of success and improvement for the future. One area we have honed in on for improvement is better including leaders in the communities that we are working in. By including the community in creating the health intervention we can create a more sustainable and effective program that meets the unique needs of the population it serves. Sharing best practices and measurement tools will also help create opportunities for funding new and improved park prescription programs. Creating a strong national collaborative with agreed upon metrics and health intervention steps will also lead to policy.

#### **Next Steps**

A convening will take place in October 2013 to bring together leaders representing parks, public health, and health plan providers to refine on-the-ground tactics for program development, program delivery, measurement, and professional training. This convening will produce national standards based on qualitative and quantitative evidence from programs across the country, elevating the initiative from a new



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idea to a best practice in preventive health. This work will result in a nationally created toolkit with relevant training's and collateral so parks and health care providers across the country can more easily implement an effective and sustainable park prescriptions model.

### **Support / Funding Source**

Kaiser Permanente; National Recreation and Park Association



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## How Much Do Neighborhood Parks Contribute to Local Residents' MVPA in the City of Los Angeles? A Meta-Analysis

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**Focus Area:** Research

### Background and Purpose

It is still largely unknown the extent to which local parks facilitate their local population's moderate-to-vigorous physical activity (MVPA). As a result, it is unclear as to whether building new parks and facilities or further promoting the use of existing ones should be the higher priority in order to effectively address insufficient MVPA in the U.S. population.

### Objectives

To quantify the contribution of Los Angeles City Parks to population-level MVPA.

### Methods

We conducted a meta-analysis of park observation data as well as surveys of park users and local residents. Data collected over 7 years from 4 studies and nearly 100 parks were included. We pooled the park observation and survey data and used a stochastic process model based on nonhomogeneous queue process. To determine the contribution of parks to population-level MVPA, we compared the average amount of hours spent on MVPA in a neighborhood park to the total hours spent on MVPA by the local population using an age-gender stratified analysis of accelerometry data collected by NHANES.(1)

### Results

The mean acreage of parks and recreation centers in Los Angeles is roughly 12 acres with an average of 2 sports fields and 8 facilities per park. The average population density within a one-mile radius is between 40,000-50,000 people. We estimate that, on average, 500 to 1,200 hours of vigorous PA (VPA) are accrued in a typical neighborhood park during one week; 1/4 to 1/3 of these hours are accrued by female park users. A park also supports on average 800 to 2,000 hours of moderate PA (MPA) during one week, where the proportion of time accrued by female users is slightly larger (300 to 1,000 hours). In total, a park supports an average of 800 to 3,000 hours of MVPA during a week. Another 2,800 to 6,000 hours of park use is spent in various sedentary behaviors such as sitting and socializing, which likely are associated with a modest proportion of MPA (e.g., walking to and from the parking lot). The majority of MVPA and VPA in particular are accrued by children, teenagers, and non-elderly adults. Estimates vary by park acreage, programming, number of facilities, local population density, and other factors. The estimated mean number of hours spent on MVPA in a single neighborhood park is roughly equivalent to the total number of MVPA hours that would have been accrued by 66-250 children and 150-600 adults if they fully adhered to national physical activity guidelines (6 hours for children and 2.5 hours for adults per week).

However, since the actual number of hours spent on MVPA is much lower than national guidelines, parks support a substantial proportion of the actual MVPA time for their local population. NHANES data show that the average person engages in 1-4 minutes of VPA per day, thus we estimate that roughly 30 to 80 percent of the total hours spent on VPA by the population living within a half mile of the park is spent in parks. On the other hand, roughly half of all park-supported MVPA is accrued by the local population living within a half mile of parks, a quarter is accrued by people living between a half and one mile of



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parks, and the remaining quarter is accrued by people living farther away than one mile. The proportion of users from longer distances declines sharply as the poverty level of a park's neighborhood increases. Self-reported data also suggest that parks are the most common place for exercise (i.e., vigorous activities) among the population they serve (park users and local residents). Among the 60% of 17,000 respondents who reported engaging in some exercise, parks were the primary places for exercise for 40-60%, who also reported an average of roughly 130 minutes of vigorous physical activities per week, most of which were spent in parks.

In contrast, we observed relatively few people doing MVPA at any time during any day in the average 12-acre neighborhood park (5-50 people). Parks were even less used in low income neighborhoods compared to higher income neighborhoods, after accounting for size and other park facilities.

### **Conclusions**

Self-reported MVPA data is subject to sizable self-report bias, due to the general tendency of over-reporting MVPA. Nevertheless, there is a great potential to further improve parks' contribution to people's MVPA without affecting other social, recreational, and environmental purposes of parks. Because the radius of influence of a neighborhood park is correlated with income level of the local neighborhood residents, it can be beneficial to build new parks in low-income areas.

### **Implications for Practice and Policy**

Parks in high-income neighborhoods should focus their efforts to develop and promote programmed activities that support MVPA, while in low-income neighborhoods, more parks and facilities may be needed in addition to more vigorous marketing and MVPA promotion efforts.

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### **Support / Funding Source**

NHLBI: R01HL114283 and R01 HL114432





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## **The Effect of a Promotional Campaign and Distance Markings on Urban Trail Use in Southern Nevada**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

The purpose of this study was to assess the effect of distance markings and the long term effect of a promotional media campaign on urban trail traffic in Southern Nevada.

### **Description**

As noted in the literature, promotional campaigns may increase trail usage. Our previous study indicated that trail traffic on 10 urban trails increased significantly shortly after a campaign designed by the Southern Nevada Health District (SNHD). This study repeated those trail traffic counts to determine if trail traffic remained higher several months after the promotional campaign. This round of traffic counts also compared traffic on four control trails with six experimental trails which received incremental distance markings. In the fall of 2011, we placed infrared sensors on 10 local trails to count all users for one week. We repeated the counts for another week in the fall of 2012. Manual user counts were also conducted to validate sensor data. We compared traffic counts from before the media campaign and marking project to the counts taken one year later.

### **Lessons Learned**

Mean hourly trail users increased 33%, from 3.84 users per hour to 5.12 users per hour, from Fall 2011 to Fall 2012. Although these increases are smaller than those measured immediately after the media campaign, they remain significant ( $p < .001$ ). Results varied at individual trails. Traffic counts increased at nine of the study trails, but one trail saw a significant decline in usage. Usage patterns by time of day and day of week were similar before and after the campaign for summary level data, but varied at the individual trail level. When we compared traffic on the six experimental trails, which received incremental distance markings in the summer of 2012, to the four control trails, we observed no significant differences in mean hourly users between the two groups after the markings were applied. The effect of the trail markings may become more clear over time.

### **Conclusions and Implications**

Between the fall of 2011 and the fall of 2012, trail traffic increased significantly ( $p < .001$ ) on 10 urban trails in Southern Nevada, after a media campaign promoting trail use. Promotional campaigns may be an effective approach to increasing the use of urban trails. This project also analyzed the effect of incremental distance markings for six of the study trails. We observed no difference in mean hourly trail users between the study and control trails.

### **Next Steps**

An additional round of data collection may be scheduled to assess differences in use between the marked and unmarked trails over time.

### **Support / Funding Source**

This project was funded by the Communities Putting Prevention to Work (CPPW) grant from the Centers for Disease Control (CDC) to SNHD (CPPW 1U58DP002382-01).



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## **Disparities in Park Availability, Features, and Characteristics by Social Determinants of Health within a U.S.-Mexico Border Urban Area**

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**Focus Area:** Research

### **Background and Purpose**

Parks are key environmental features for promoting physical activity and health [1,2] and several studies highlight that park availability, features, and quality are often not be equally-distributed across socioeconomically-deprived and racially/ethnically diverse neighborhoods in the U.S.[3-7] However, to date, little, if any, such research has been conducted in minority-heavy areas along the U.S.-Mexico border where poverty, justice, and health disparities are prominent concerns.[8]

### **Objectives**

The purpose of this study was to examine disparities in park availability, park features, and park characteristics according to median household income and the percentage of foreign-born population in a predominately Hispanic border community.

### **Methods**

All census tracts (CTs) within the City of El Paso, TX were included in the study (n=112). Data on median household income and the percentage of foreign-born population for each CT were extracted from the U.S. Census Bureau's 2005-2009 American Community Survey. All CTs were categorized into even tertiles (low/medium/high) for both variables.

To measure park availability, a GIS shape file provided by the City of El Paso was used to identify all parks within the study area. Using ArcGIS 9.3, the edited park layer was cross-referenced with the CTs layer to determine the number of parks that intersected each CT.

Data on park features and characteristics were obtained by a trained auditor visiting each park (n=144) using the Community Park Audit Tool (CPAT), which has demonstrated excellent reliability.[9] The total number of each of i) park facilities (e.g., playgrounds, basketball courts, trails), ii) park amenities (e.g., benches, drinking fountains, picnic tables), iii) aesthetic features (e.g., landscaping, artistic features, historical/educational monuments), iv) park quality/safety concerns (e.g., evidence of threatening behavior, dangerous spots, vandalism), and v) quality/safety concerns in the neighborhood visible around the park (e.g., inadequate lighting, graffiti) were summed for each CT.

Univariate analyses were conducted on all park variables to provide descriptive statistics and to assess normality (skewness between -1 and 1 and symmetrical histograms). ANOVA F-tests (for normally-distributed park variables) and Kruskal-Wallis X<sup>2</sup> tests (for non-normal variables) with post-hoc analyses were used to determine significant (p<.05) differences in the total number of parks, park features (facilities and amenities), and park characteristics (aesthetic features, park quality/safety concerns, neighborhood quality/safety concerns) across CT income and percent foreign-born tertiles (low/medium/high).

### **Results**

The results of all analyses are shown in Table 1. Park availability differed significantly by median household income (X<sup>2</sup>=6.71,p=0.03), with the medium tertile having more parks than the high tertile (p=0.01). There was no significant difference for park availability across percent foreign-born tertiles (X<sup>2</sup>=1.51,p=0.47).



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The number of park facilities ( $F=10.21, p<0.01$ ) significantly differed across income tertiles, with the medium income tertile having significantly more facilities than the low ( $p<0.01$ ) or high ( $p=0.02$ ) income tertiles. The overall ANOVA test examining the number of amenities across income tertiles was significant ( $F=3.77, p=0.03$ ), but further post-hoc pairwise comparisons showed no significant differences between the three groups. Neither the number of park facilities ( $F=2.10, p=0.13$ ) nor amenities ( $F=1.64, p=0.20$ ) differed significantly across percent foreign-born tertiles.

Finally, the number of park aesthetic features did not differ significantly across either income ( $F=0.29, p=0.75$ ) or percent foreign-born ( $F=0.09, p=0.91$ ) tertiles. However, there were several differences in park quality/safety concerns and neighborhood quality/safety concerns across income and percent foreign-born tertiles ( $X^2=26.21, 30.40, 39.95, 42.69, p<0.01$  for all tests). Specifically, the low and medium income tertiles had significantly more park quality/safety concerns than the high income tertile (both  $p<0.01$ ). The low income tertile also had more neighborhood quality/safety concerns than the medium or high income tertiles (both  $p<0.01$ ). Both the high and medium foreign-born tertiles had significantly more park quality/safety concerns than the low foreign-born tertile (both  $p<0.01$ ) and the high foreign-born tertile had significantly more neighborhood quality/safety concerns than the low or medium foreign-born tertiles (both  $p<0.01$ ).

### Conclusions

This study adds to the current literature on park disparities by income and race/ethnicity and provides evidence of the complexity of examining such issues within a U.S.-Mexico border community. Our findings further demonstrate how publically-available recreational facilities, and their features and characteristics, are often not equally-distributed across neighborhoods by income or foreign-born composition.

### Implications for Practice and Policy

The present study was unique in that it highlighted these issues within a predominately Hispanic community. Planners and policymakers must be careful not to negate the reported "barrio advantage" – a paradoxical situation in which certain sociocultural benefits of living in high-density Mexican American neighborhoods (e.g., intact family structures, shelter from negative aspects of American culture) outweigh the disadvantages of high rates of poverty in those neighborhoods [10] – through the provision of less than optimal environmental resources (e.g., parks) as well. Moreover, especially in traditionally under-empowered and under-resourced communities, citizens, health researchers, and policy makers should be encouraged to collectively engage in evaluating community environments to facilitate partnerships and collaborative efforts to make parks and other recreational facilities more accessible, attractive and safe for physical activity for all.[11,12]

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### Support / Funding Source

This study was partially supported by funding from Hispanic Health Disparities Research Center (NIH 1P20MD002287-03) and the Pan American Health Organization.

*Table 1*  
*Park Availability, Features, and Characteristics by Income and Percentage of Foreign-Born Residents*

	Census Tracts	Availability	Facilities	Amenities	Aesthetic Features	Park Quality/Safety Concerns	Neighborhood Quality/ Safety Concerns
	N	Median (Q1, Q3)	Mean (SD)	Mean (SD)	Mean (SD)	Median (Q1, Q3)	Median (Q1, Q3)
<b>Median Income</b>							
Low	38	0.00 (0.00, 1.00) <sup>ab</sup>	3.34 (2.64) <sup>a</sup>	6.70 (2.08)	1.21 (1.16)	2.00 (1.00, 3.00) <sup>a</sup>	4.00 (2.00, 6.00) <sup>a</sup>
Medium	38	0.00 (0.00, 1.00) <sup>a</sup>	6.29 (3.93) <sup>b</sup>	7.91 (2.44)	1.18 (0.93)	2.00 (1.00, 2.50) <sup>a</sup>	2.00 (0.50, 3.00) <sup>b</sup>
High	36	0.00 (0.00, 0.00) <sup>b</sup>	4.42 (2.97) <sup>a</sup>	6.79 (2.71)	1.33 (0.95)	0.50 (0.00, 1.80) <sup>b</sup>	1.00 (0.00, 2.00) <sup>b</sup>
F or $\chi^2$		6.71	10.21	3.77	0.29	26.21	39.95
p		0.04	<0.01	0.03	0.75	<0.01	<0.01
<b>Percent Foreign-Born</b>							
Low	39	0.00 (0.00, 1.00)	5.00 (3.51)	7.10 (2.68)	1.29 (0.92)	1.00 (0.00, 1.75) <sup>a</sup>	1.00 (0.00, 2.00) <sup>a</sup>
Medium	37	0.00 (0.00, 1.00)	5.20 (3.50)	7.61 (2.81)	1.20 (0.98)	2.00 (1.00, 2.00) <sup>b</sup>	2.00 (0.00, 3.00) <sup>a</sup>
High	36	0.00 (0.00, 1.00)	3.87 (3.19)	6.70 (1.76)	1.23 (1.15)	2.00 (1.00, 4.00) <sup>b</sup>	4.00 (2.00, 6.00) <sup>b</sup>
F or $\chi^2$		1.51	2.10	1.64	0.09	30.40	42.69
p		0.47	0.13	0.20	0.91	<0.01	<0.01

**Table 1 Notes:**

1. Means, standard deviations (SD), and ANOVA (F) test statistics are provided for continuous variables that were normally distributed.
2. Medians, first and third quartiles (Q1, Q3), and Kruskal-Wallis ( $\chi^2$ ) test statistics are reported for continuous variables that were not normally distributed.
3. Mean or median values with different superscript letters were significantly different from one another ( $p < .05$ ).



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## Physical Activity and Sedentary Behavior Trends among Brazilian Adults, 2009-2012

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**Focus Area:** Research

### Background and Purpose

Physical activity is an important determinant of overall health by preventing diseases and promoting health. Major advances in continuous monitoring of indicators of physical activity and sedentary behavior were achieved in Brazil in recent years through the consolidation of the Surveillance of Risk and Protective Factors for Chronic Diseases Telephone Survey (Vigitel). Previous data from Vigitel (2006-2009) showed unfavorable physical activity and sedentary behavior trends and persistency of inequities against vulnerable groups (children, elderly, women and less educated people). These have led to many national public policies seeking to promote physical activity and reduce sedentary behavior.

### Objectives

To analyze time trends in physical activity levels and sedentary behavior in Brazilian adults from 2009 to 2012.

### Methods

We used data from Vigitel, a cross-sectional telephone-based study of adults (18 or older) living in households with a fixed telephone line in all 26 Brazilian capitals and the Federal District. We estimated trends from 2009 to 2012 for four indicators: (I) active in leisure time (weekly practice of at least 150 minutes of moderate physical activity or 75 minutes of vigorous physical activity during leisure time), (II) active in transportation to work or school (usual roundtrip of at least 30 minutes to work or school using bicycle or walking), (III) physically inactive (absence of any physical activity in leisure time in the last three months; of physical exertion at work; of commuting to work or school by walking or cycling and of performing heavy house cleaning), (IV) time watching television of three or more hours a day (proxy of sedentary behavior). The prevalence of indicators was presented by sex, age and education level of the study population for the year 2012. Poisson regression models were used to determine significant variation in the indicator between 2009 and 2012, having the year as the independent variable. We considered changes significant when regression coefficients for the variable 'year of survey' were statistically different from zero for a p-value of less than 0.05.

### Results

Between 2009 and 2012, we identified an increase in the proportion of actives in leisure time (men: 39.0 to 41.5%; women: 22.1 to 26.5%) ( $p < 0.01$ ) and a reduction in the proportion of actives at transportation (men: 17.6 to 13.8%, women: 16.5 to 14.5%) ( $p < 0.001$ ). Also, the prevalence of physical inactivity in both sexes remained unchanged (~15%), while the proportion of men who watch three or more hours of TV daily increased (22.4 to 26.5%) ( $p < 0.001$ ). In 2012, leisure-time physical activity was higher in men, directly associated with education and inversely associated with age. Active transportation decreased only after 55 years of age and was inversely associated with education. Watching TV for more than 3h/day was more prevalent in the youngest (18-24 y) and in the oldest (= 55 y) and inversely associated with education. Physical inactivity increased only after 55 years of age.

### Conclusions

The time-trend analysis reveals a worrying scenario: stagnation in high levels of physical inactivity, reduction of active transportation and increase of TV watching among men. Also, similarly to what had



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been previously observed, inequities against vulnerable groups persist in all outcomes, even in leisure-time physical activity (the only indicator with positive trends in the studied period). This scenario might indicate low short-term effectiveness of the increasing governmental efforts to promote physical activity in the country, although specific evaluation studies are still needed.

### **Implications for Practice and Policy**

Improvements in surveillance systems have provided valuable information on population levels of physical activity and sedentary behavior in Brazil. The current unfavorable context concerning physical activity requires cross-sector policies and comprehensive evaluation of interventions. Also, programs and policies with evidence of suitability and cost-effectiveness in developing countries should be prioritized, such as the consolidation of physical activity at school and the expansion of Open Streets programs for active recreation.

### **Support / Funding Source**

Agency of the São Paulo Research Foundation (Fapesp).





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## **Implementing Successful Promotora-led Advocacy Projects in Latino Churches and Neighborhoods in San Diego**

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*<sup>1</sup>San Diego State University Research Foundation, <sup>2</sup>WalkSanDiego, <sup>3</sup>San Diego State University*

**Focus Area:** Research

### **Background and Purpose**

The built environment and neighborhood characteristics of a community are associated with the physical activity (PA) levels of its residents (Saelens, Sallis, Frank, 2003). For example, perceived neighborhood safety, aesthetics, traffic, and other factors, can facilitate or discourage physical activity among community residents (Kerr et al., 2010). Sallis and colleagues found that neighborhood income disparities are associated with perceived attributes of the built environment, and can discourage or facilitate physical activity (Sallis et al., 2011). In Texas border communities, frequent barriers to physical activity include: unleashed dogs, weather, heat, traffic, no streetlights, and no place like a park to exercise (Umstattd Meyer, Sharley, Patterson, Dean, 2013).

Several programs have successfully utilized promotoras (Spanish-speaking community health workers) to promote healthy behaviors, provide access to community resources, and lead physical activity and nutrition sessions (Balcazar et al., 2006; McCloskey, 2009; Staten, Scheu, Bronson, Peña, & Elenes, 2005). A pilot study in San Diego found that promotoras and youth community members could successfully collaborate and advocate for resources to improve their neighborhood and a nearby park (Arredondo et al. 2013). Similarly, others have engaged promotoras as co-researchers and advocates for policy change in a project to promote environmental justice in a Latino community (Minkler, Garcia, Williams, LoPresti, & Lilly, 2010).

### **Objectives**

The objectives of this study are to increase physical activity opportunities by: 1) identifying determinants of successful advocacy programs that aim to improve the built environment; and 2) outlining the steps and strategies necessary in empowering promotoras to lead health promotion activities and built environment improvement projects in their local communities.

### **Methods**

Sixteen churches were recruited and randomized to either the intervention (PA) or attention control (cancer prevention) for the larger parent study between January 2011 and March 2013. Selection criteria for promotoras included involvement in church and community, bilingual (English/Spanish), and readiness for training. In each church, two to three women were recruited, hired, and trained to be promotoras. The promotoras in the intervention (PA) churches were trained to lead multiple group exercise classes and walking groups at their for the two-year intervention period. After six months, WalkSanDiego conducted two 4-hour Advocacy Training Workshops to empower promotoras and members of each intervention church by providing tools to create local change on a grass-roots level and to advocate for improvement in their churches and surrounding neighborhoods. The first workshop reviewed the basics of advocacy, defined walkability, led participants in a walk audit of the church neighborhood, and detailed steps for creating an action plan. The second workshop taught participants how to create a fact sheet, provided tips on contacting local officials, assisted participants in identifying and prioritizing targets for change, and addressed sustainability. Promotoras then applied their learned advocacy skills during meetings with church members, where they identified targets for built environment change to promote physical activity. and prioritized one church-based and one community-based project. Once targets were identified,





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promotoras and church members partnered with WalkSanDiego, Fe en Acción staff, community organizations, and their churches to advocate for built environment changes.

### Results

Promotoras in all 8 intervention churches completed Advocacy Training Workshops with WalkSanDiego. Additionally, targets for change were identified at both the church and community levels. In most cases, church projects were more difficult to complete than community projects. Church readiness for change was a major factor in the success of the church-based projects. The priest's readiness for change and the cohesion of church members and their interest in the project determined, in large part, the success of built environment changes. Success of community-based built environment improvements varied by site, which can be attributed to community characteristics (i.e. urban vs. rural, high-income vs. low-income, etc.), personal characteristics of the promotoras themselves, and the presence or lack of other groups already working on built environment improvements. Case studies will be presented on four different communities to illustrate factors that facilitated environmental changes.

### Conclusions

Future programs should take into account a promotora's availability and willingness to attend and present at large community and church meetings. Also, programs should aim to identify realistic targets for change, given the program's timeline. In addition, relationships with key leaders, both at the church and community levels, should be developed from the beginning of the program and communication maintained throughout. Finally, future programs should consider partnering with other community programs and initiatives already working to improve community health and build on their success.

### Implications for Practice and Policy

The environmental advocacy component of the Fe en Acción study found that churches are an untapped resource of organizing and advocacy power. Choosing the right leaders, in this case promotoras, makes all the difference. Finally, we found that the setting also matters in that heavy resistance from leaders, both at the church and communities levels, yields few positive results.

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**Support / Funding Source**

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## **Progress in Latino Childhood Obesity Prevention: Salud America! Findings on What Works Best for Increasing Out-of-School and Out-of-Class Playtime Among Latino Kids**

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**Focus Area:** Research

### **Background and Purpose**

In the United States, rates of overweight and obesity among Latino children (39%) are higher than those among their White peers (28%).<sup>(2)</sup> Physical activity is important for good health, physical and cognitive growth and development, and maintaining a healthy weight.

Latino children are less likely than other groups to get the recommended 60 minutes of physical activity per day, which adds to the problem of higher than normal Body Mass Index's (BMI) and obesity rates within the Latino community—and puts them at an increased risk of developing chronic diseases at a young age.<sup>(3)</sup> Many factors may contribute to less activity among Latino children, yet limited understanding of the reasons for this gap remains.

To address this, Salud America! The Robert Wood Johnson Foundation Research Network to Prevent Obesity Among Latino Children, which aims to increase the number of stakeholders conducted research and community change to reduce and prevent Latino childhood obesity (LCO), has synthesized research and developed policy recommendations on “Active Play and Latino Kids” to fuel discussions and stimulate changes in policies that will increase out-of-school and out-of-class play time among Latino kids.

### **Objectives**

The main objectives of this study were to: (1) review and consolidate the field of evidence related to initiatives and research focused on out-of-school and out-of-class play time and its impact on physical activity levels among Latino children in underserved communities; and (2) based on the evidence, create policy recommendations for increasing active play time in predominantly Latino communities.

### **Methods**

A comprehensive review of studies, policy statements, and legislation published between 2000 and 2012 was conducted using Google Scholar and PubMed, as well as government and organization websites, to identify literature relevant to increasing physical activity among Latino children.

Terms like Hispanic Americans, Mexican Americans, Latino, adolescent, child, community, neighborhood, obesity, motor activity, physical activity, recreation, and schools were used during electronic searches; and only studies written in English and conducted among youth up to 19 years of age, from the US, were analyzed. Survey-based research comprised most of the studies reviewed; however randomized control trials of physical activity were also included.

### **Results**

**Fewer Parks & Places of Recreation Available to Latinos; Neighborhood Safety Remains A Concern**

Latino children are more likely to live in poverty (34.1% vs. 12.5%) and less likely to have access to parks and places of recreation, when compared to White children.<sup>(4)</sup> They are also more likely to live in unsafe neighborhoods.<sup>(5)</sup> Conditions of the built environment and neighborhood safety may affect how often families use active transportation to get to recreation sites and how frequent children participate in



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outdoor activities.(6) Also, fewer schools (29% vs 35%) provided access to their physical activity facilities in 2006 than in 2000.(7)

## Mixed Results on How Levels of Assimilation Affect Physical Activity

While some studies found that first- and second- generation adolescents were less likely to get recommended amounts of physical activity than third generation Latinos, others found that those who were more acculturated had a greater tendency to be sedentary.(8)

## Culturally-Relevant Structured Programs, Parental Involvement & Walking School Buses May Increase Activity Levels

Schools with a predominantly Latino population were less likely to offer daily P.E., allot at least 150 minutes per week to physical activity, and have access to recreational facilities.(9) Walking school buses and structured physical activity programs in school settings have shown promise for increasing physical activity among children; however, a lack of parent volunteers has been cited as a challenge in organizing these programs. Culturally relevant community based interventions and marketing campaigns may also increase out-of-school physical activity time.

Because parenting styles, perceptions, and behaviors may influence the amount of physical activity Latino children receive, interventions aimed at parents may help increase levels of activity.(10-11) Children whose parents monitored and rewarded healthy behaviors demonstrated increased levels of physical activity compared to those who did not.

## Conclusions

Improving neighborhood infrastructure and neighborhood safety; changing Latino parents' perceptions about healthy weights and empowering them to reinforce more active play time; and developing collaborative partnerships, are important for the development and proper implementation of policies to increase physical activity in Latino children.

## Implications for Practice and Policy

1. Programs are needed to educate Latino parents on strategies for improving physical activity among their children. The physical activity and eating scale (PEAS) is a valid and reliable tool that may be a useful tool for developing interventions.(12)
2. Communities should collaborate on ways for Latino children to receive the recommended 60 minutes of daily physical activity for all children.
3. Maps created using GIS systems can help organizers: locate the safest routes to school; find the nearest resources; identify areas of greatest need; and determine the location of new parks and recreation spaces, in Latino communities.
4. Complete Streets policies and Safe Routes to School programs may help improve neighborhood infrastructure and safety in Latino Communities.

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### **Support / Funding Source**

Salud America! The Robert Wood Johnson Foundation Research Network to Prevent Obesity Among Latino Children is funded by the Robert Wood Johnson Foundation (ID 70208).



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## **Policy Implications: Salud America! Examines the Utilization of Shared Use Agreements and Improving the Built Environment in Latino Neighborhoods**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

In the United States, rates of overweight and obesity among Latino children (38%) are higher than those among their White peers (29%). Physical activity is important for good health, physical and cognitive growth and development, and maintaining a healthy weight. 1

Latino children in underserved communities often have limited options for physical activity and Latinos, more so than their white counterparts perceive their neighborhoods as having few safe places for children to play (70% versus 82.5%).<sup>2</sup>

To address this, Salud America! The Robert Wood Johnson Foundation Research Network to Prevent Obesity Among Latino Children, which aims to increase the number of stakeholders conducted research and community change to reduce and prevent Latino childhood obesity (LCO), has synthesizing research and developed policy recommendations on “Active Spaces and Latino Kids” to fuel discussions and stimulate changes in policies that will increase the amount of publicly available active spaces for Latino kids.

The main objectives of this study were to: (1) review and consolidate the field of evidence related to initiatives and research focused on built environments and street-scale improvements and their impact on physical activity behaviors among Latino children in underserved communities; and (2) based on the field of evidence, create policy recommendations for improving environments in predominantly Latino communities.

### **Description**

Electronic searches of PubMed, Google Scholar, and government and organization websites were performed to identify literature, policy statements, and legislation published between 2000 and 2012 that were relevant to the implementation of shared-use agreements (SUAs) and street-scale improvements to increase physical activity among Latino children, defined as individuals younger than 18.

### **Lessons Learned**

This Salud America! study generated interesting findings on the factors that affect the opportunities Latino children have to seek physical activity in their neighborhoods and also provided guidance as to the best ways to increase active spaces in Latino communities.

Common themes and significant findings are outlined below.

1. Latino children living in underserved communities in the United States have limited access to recreation sites. 3-6
2. Limited progress has been made in the sharing of school recreational facilities with community members. Some Latino communities have implemented SUAs and succeeded in providing residents with more access to recreational facilities. 7
3. Liability concerns, funding and staffing are among the top barriers to sharing school physical activity facilities with community members. 8,9



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4. Characteristics of neighborhoods and the built environment may affect how frequently children and families walk or bike to sites available for recreation and physical activity. 10-12
5. Multi-dimensional tools for assessing the impact of the built environment on physical activity are crucial for planning recreation facilities that meet the needs of Latino communities and increasing the use of the facilities among Latino children in underserved communities. 13-15

### Conclusions and Implications

Shared use agreements and street-level improvements are among the best ways to improve access to these “active spaces” in underserved communities and may help young Latinos become more physically active and maintain a healthy weight.

#### Implications for Practice and Policy:

Efforts should focus on meeting the following needs to increase access to physical activity sites and facilities in Latino underserved communities:

1. Street-scale improvements (e.g., repairing sidewalks and installing bike lanes and street lights) can address concerns about environmental barriers and improve perceptions of the built environment, potentially increasing levels of physical activity among Latino children in the community.
2. Appropriate measures must be used to assess the built environment and ensure that new and existing areas for physical activity meet the specific cultural needs of the Latino community.
3. State and local governments should work with school administrators to address liability and other concerns for schools that pave the way for access to their facilities for recreational use during non-school hours.
4. State and local governments should ensure that SUAs and other statutes specifically describe covered activities, terms and conditions.
5. State and local governments should encourage awareness of current statutes and adoption of SUAs among school administrators.
6. Local governments and policymakers should solicit community feedback to strengthen the development of new recreation sites and implementation of street-scale improvements.
7. Local governments and policymakers should create Complete Streets policies for all new transportation projects near schools and recreation sites to improve active travel to those sites.

View complete findings and policy implications in the Salud America! report on “active spaces” <http://salud-america.org/sites/salud-america/files/Active-Spaces-Research-Review.pdf>.

### Next Steps

To increase access to physical activity sites in Latino communities, further research is needed on the effectiveness of SUAs for increasing physical activity in Latino communities. Real and perceived barriers to implementing SUAs should be further explored to identify areas for improvement in policies and legislation and to educate stakeholders on how to overcome the barriers. In addition, refinements to tools used to assess built environments are needed to potentially become more applicable to Latino communities to ensure that street-scale improvements and physical activity sites are well informed and in the best interest of the Latino community.

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A list of all references can be found at: <http://salud-america.org/sites/salud-america/files/Active-Spaces-Research-Review.pdf>.

### **Support / Funding Source**

Salud America! The Robert Wood Johnson Foundation Research Network to Prevent Obesity Among Latino Children is funded by the Robert Wood Johnson Foundation (ID 70208).



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## Developing the Active Living Plan for a Healthier San Antonio: Lessons Learned

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**Focus Area:** Practice/Policy

### Background and Purpose

Despite the evidence that regular physical activity (PA) is essential for good health, many Americans do not meet the PA guidelines. In San Antonio, Bexar County, Texas, only 1 in 4 adults and 1 in 3 youth meet the PA guidelines. Strategies to facilitate and support physical activity opportunities for people of all ages must be identified and implemented at the local level. The local health department (LHD) of San Antonio initiated a multi-sector collaborative effort to increase PA among residents by establishing the Active Living Council of San Antonio (ALCSA) to create a 3-5-year master plan and policy recommendations to encourage active living in the community. The current study describes the 2-year process of forming a multi-sector community coalition and writing a plan to promote active living in San Antonio.

### Description

An ALCSA Steering Committee (SC) composed of LHD staff and community organization representatives convened to organize and launch the ALCSA. After learning about active living and PA-promoting initiatives at the national, state, and local levels, the SC set preliminary ALCSA goals: 1) Provide a forum to address active living issues; 2) Promote coordination among various sectors that impact active living; 3) Foster local PA and active living projects; 4) Promote improved access to places and programs for PA; and 5) Promote policies related to increasing PA and active living. The SC determined ALCSA's membership will represent multiple sectors and activities should reflect current evidence and national guidelines. The SC created ALCSA membership categories to mirror the 8 sectors of the National Physical Activity Plan (NPAP) and added 2 general membership categories to ensure broad community representation. The 20-member council includes 2 volunteer members for each membership category. Following a coordinated outreach effort to recruit applicants, the SC selected ALCSA members and outlined initial council activities, concluding SC responsibilities.

ALCSA wrote vision and mission statements, adopted a governance framework, elected officers, and devoted much time to internal capacity-building about PA and health, relying on evidence-based resources to guide discussions about PA-promoting strategies. Drawing on diverse expertise among members and participating in a variety of educational opportunities, members became well-informed active living advocates. ALCSA conducted outreach to other coalitions and organizations to identify opportunities to align and support local initiatives. Seeking broad community input about local needs and priorities related to active living, members engaged their sector constituents in a variety of ways, such as presentations to professional networks and distribution of a sector-specific online survey.

Master plan development was a multi-step, collaborative process. Given the NPAP's PA focus, multi-sector approach, and use of evidence-based strategies to advance active living, the NPAP emerged as the key resource for guiding development of ALCSA's master plan. ALCSA adopted the NPAP's overall structure and selected strategies which reflected San Antonio's needs and priorities and could make an impact in a 3-5-year period. Members embarked upon a plan-writing process to articulate priorities, guide allocation of resources, establish measures of success, and generate a sense of urgency about the importance of PA to the overall health of the community. A sub-committee (writing team) led the plan-writing effort and engaged all members throughout the process. The plan includes overarching and sector-specific strategies. The writing team outlined overarching strategies (see Table 1), whereas sector partners took the lead on sector strategies. The writing team provided drafts for members to review and



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incorporated feedback received, an iterative process which took place over 7 months. LHD staff and other local leaders as well as national experts reviewed final drafts over the subsequent 5 months. This process produced the Active Living Plan for a Healthier San Antonio, a plan that reflects national recommendations and fits San Antonio's local context.

### Lessons Learned

Participatory planning required a large commitment of volunteer time in addition to LHD staff time. Though information sharing about development and implementation of local PA initiatives would have been helpful in guiding ALCSA's efforts, we did not find examples in the literature detailing experiences of other local multi-sector active living coalitions. Despite broad conceptual support for collaborative multi-sector community initiatives to promote active living, practices supportive of equitable partnerships are challenging and demand shared leadership, transparency, clearly-defined expectations, and extensive communication.

### Conclusions and Implications

ALCSA adapted the U.S. National Physical Activity Plan (NPAP) to a local context. The Active Living Plan for a Healthier San Antonio is a 3-5-year roadmap for transforming San Antonio into a community that promotes and supports active living among its residents.

### Next Steps

The plan received endorsements of San Antonio's Mayor Julian Castro and the local Mayor's Fitness Council, which recently incorporated ALCSA as a standing committee to advance implementation of the plan. Education and outreach efforts with decision makers and sector constituents about the plan's strategies to promote active living are underway and an evaluation plan is being developed.

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### Support / Funding Source

ALCSA is one of the initiatives of San Antonio's Communities Putting Prevention to Work grant supported by funding from the Centers for Disease Control and Prevention (#1U58DP002453-01).



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**Table 1: Overarching Strategies**

Mobilize public support for strategies and tactics included in the <i>Active Living Plan for a Healthier San Antonio</i> .
Recommend and disseminate best practice physical activity models, programs, and policies to ensure residents will meet physical activity guidelines.
Create a local resource center to disseminate effective tools and coordinate active living policy development for promoting physical activity across all sectors of Bexar County.
Identify gaps and mount a local physical activity education program to educate residents both about why they should and how they can increase physical activity. Integrate the program with other local, state, and national health promotion and disease prevention education campaigns.
Incorporate a “Health” component into the Comprehensive Plan for the City of San Antonio.
Promote and publicly recognize local entities, such as developers, municipalities, neighborhoods, and school districts that significantly support the concepts and implementation of the Active Living Plan for a Healthier San Antonio.



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## **Surveillance and Management Toolkit Positions Parks and Recreation as a Public Health Provider**

*Teresa Penbrooke, MAOM<sup>1</sup>*

<sup>1</sup>*GP RED and North Carolina State University*

**Focus Area:** Practice/Policy

### **Background and Purpose**

The Healthy Communities Research Group (HCRG) was created by Dr. David M. Compton while at Indiana University, to help position parks, recreation, and related community agencies as public health providers. The purpose is to develop and test the Surveillance and Management Toolkit - a step by step systematic assessment that allows communities to determine the key factors, indicators, and actions necessary to help reduce obesity and increase physical activity. The testing is currently focused on ages 10 - 14 in the community but the Toolkit can be used to identify factors for all ages. Funding currently comes from GP RED, a 501(c)(3) public charity that provides research, education, and development for health, recreation, and land management agencies, with community funding support for hard costs, along with alliances and support from East Carolina University, and direction from the HCRG Director, Teresa Penbrooke, currently a PhD student at North Carolina State University.

### **Description**

Since 2009, the GP RED Healthy Communities Research Group (HCRG) has been working to develop and test the Healthy Communities Surveillance and Management Toolkit. The project targets the community aspects that influence obesity and active living, specifically targeting ages 10 to 14, and helps to position parks and recreation agencies and partners as key public health providers. The initial "alpha project" with Indiana University in Bloomington, Indiana in 2010 was successful, and the methods are now being integrated into a training process and toolkit and applied to additional "beta" site communities for further refinement, testing, and implementation in the future. South Bend, IN, is just completing Year Three of the project, and Liberty, MO is finishing Year One. Other communities are in funding stages. This presentation will cover methodology, outcomes, and evaluation of the Toolkit and its applications.

The Surveillance and Management Toolkit helps parks, recreation, and related departments and agencies assess, analyze, document, and evaluate five systematic elements related to the re-positioning of parks and recreation as a primary preventative community public health provider:

1. Convening Community Stakeholders and Champions – Residents? Partners? Providers?
2. Creating a Warrant for Agency Action – Why? Who? What is the Impact?
3. Policies, Laws, and Procedures – What is influencing obesity and/or active living?
4. Fiscal Resources and Distribution – What funds? How should they be allocated?
5. Inventory of Assets and Affordances – Programs? Parks? Facilities? Food?

From an inventory and quantitative and qualitative analysis of these elements, the project moves to creation of a systems portfolio, strategic concepts for improvement, and future modeling for the purposes of articulation, prioritization, management, and surveillance of outcomes over time. The process utilizes a specially designed Multi-Attribute Utilities Theory (MAUT) process to quantitatively determine evidence-based indicators, and as a tool for discerning consensus on healthy contributors in any community. Using current best practices for management, along with Composite-Values Method (CVM) for Level of Service Analysis, the process compiles a complete inventory of GIS-based relevant assets and affordances. This information was then integrated into the five-element analysis, including policy, fiscal, environmental, and Stella® implementation modeling, with evaluation and outcomes determined for each year.



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## **Lessons Learned**

The Surveillance and Management Toolkit has been created over a three-year development and testing phase. The Toolkit and process has been modified through implementation of three different communities, and still undergoing additional testing. Adjustments have been made for all inventory templates to ensure practitioner and agency management ease of use, along with modifications to the MAUT process and Stella Modeling process to ensure accuracy and relevant results.

## **Conclusions and Implications**

A step by step standardized but flexible systematic assessment process has been needed by public agencies and their community partners to help ascertain accurate factors and indicators to help reduce obesity and increase active living, and to position parks and recreation as key public health providers. This Surveillance and Management Toolkit has been successfully utilized and is being tested, and is now ready for peer review and refinement for broad community implementation to address these issues.

## **Next Steps**

The intention is to identify up to 10 Beta site communities of various demographic profiles around the U.S., continue testing and validation, and then to publish the Surveillance and Management Toolkit for broad-based practitioner and community implementation and application.

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## **Support / Funding Source**

Support provided by GP RED, East Carolina University, Indiana University, and North Carolina State University.



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### **A Strategic Alliance to Improve Elementary Physical Education in an Urban School District**

*Hannah Thompson, MPH<sup>1</sup>, Robin Haguewood, MPH<sup>2</sup>, Nicole Tantoco, BA<sup>2</sup>, Kristine Madsen, MD, MPH<sup>2</sup>*

*<sup>1</sup>University of California, San Francisco, <sup>2</sup>University of California, Berkeley*

**Focus Area:** Research

#### **Background and Purpose**

The Institute of Medicine recently identified physical education (PE) as an optimal strategy to improve current youth physical activity levels, as PE provides an ideal opportunity for all students to be physically active.<sup>1-3</sup> In California, education policy requires that elementary students receive 200 minutes of scheduled PE every 10 days.<sup>4</sup> However research in California has shown suboptimal compliance with PE policy and has demonstrated that disparities exist, with schools in non-compliant districts having a significantly greater proportion of students who qualify for free or reduced-price meals.<sup>5</sup> To our knowledge, no research has identified best practices for ensuring compliance with state PE mandates. Strategic alliances, based on the strengths of collective action, represent groups of organizations voluntarily collaborating to address problems that are too large or complex for any one organization to solve independently.<sup>6</sup> Utilizing local resources and harnessing collective interest, we formed a strategic alliance (between the school district, Department of Public Health (DPH), and a research university) in order to assess local PE practices in the San Francisco Unified School District (SFUSD). The primary goal of the alliance was to improve adherence to state PE policy mandates. Analyzing the process by which strategic alliances facilitate change, as well as the barriers and facilitators that impact such change, may help improve community health.

#### **Objectives**

To detail the alliance's actions to improve PE; to describe the impressions of those efforts on district- and school-level (systems-level) change in PE; and to identify lessons learned that could aid future alliances in achieving greater PE policy compliance.

#### **Methods**

Semi-structured interviews with 7 alliance members, 20 principals, and 50 teachers in 20 randomly selected elementary schools, 3 years post-alliance formation. All interviews were audio recorded, transcribed, and coded using a combination of the constant comparative method (to generate new grounded theories from the data) and a thematic analysis approach to segment, categorize, and link aspects of the data based on pre-determined theories, before final interpretation of the data.<sup>7</sup>

#### **Results**

Alliance actions are detailed in Table 1. Interviewee characteristics are described in Table 2. Interviewees reported district-level increases in priority and funding for PE post-alliance's actions. Collecting and disseminating local data contributed to the alliance's achievements. Alliance members, principals, and teachers discussed the critical role funding plays in PE implementation and identified insufficient funding as a barrier to successful PE implementation. Interviewees described a lack of significant changes in rules and regulations regarding PE at the district-level. All of the alliance partners cited the clear identification of common goals and trust between SFUSD, the DPH, and the university as keys to the alliance's achievements; differences in communication styles and differing opinions on best methods for disseminating data were identified as challenges.

#### **Conclusions**

Increasing PE will benefit children's health, but creating change within a school district is complicated. Alliances may be a way to increase compliance with health policy; bringing together multiple partners with differing perspectives but shared interests may support action from multiple directions. Local data can be





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useful in clarifying and promoting discussions at a district level, yet school-level change may take longer to occur and may necessitate formally increasing accountability for PE at the district or state level. Future research should focus on methods to realistically and cost-effectively increase PE policy compliance, thereby increasing access to regular physical activity for youth.

### **Implications for Practice and Policy**

School-level changes in PE policy compliance may be linked to district- or state-level accountability measures and may take longer to implement than district-level change. Further research on increasing PE policy compliance at the school-level is needed, and could include examining efforts increase the academic priority for PE by making it a core competency with common assessments, or including PE minute compliance as part of state-wide school success measures (like California's Academic Performance Index score, which measures the academic performance and growth of schools).

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### **Support / Funding Source**

California Obesity Prevention Program and the SFUSD Public Education Enrichment Fund



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**Table 1: Timeline of Key Alliance Events**

<b>Date</b>	<b>Event</b>
May 2010	<ul style="list-style-type: none"> <li>DPH convenes the first PE Advocates Meeting</li> <li>Alliance between Research University, DPH, and School District is formed</li> </ul>
May 2010 - present	<ul style="list-style-type: none"> <li>Ongoing monthly or bi-monthly PE Advocates Meetings</li> </ul>
June 2010	<ul style="list-style-type: none"> <li>Alliance decides to focus efforts on research study</li> <li>DPH applies for funding from California Obesity Prevention Program</li> </ul>
Aug 2010	<ul style="list-style-type: none"> <li>DPH is awarded funding</li> <li>Alliance receives approval from District for study</li> </ul>
Oct 2010	<ul style="list-style-type: none"> <li>Alliance presents study plan to the Board of Education</li> </ul>
Feb - May 2011	<ul style="list-style-type: none"> <li>Initial research study takes place in the District</li> </ul>
Sept 2011 - Present	<ul style="list-style-type: none"> <li>Alliance convenes to discuss study results and next steps</li> </ul>
Oct 2011	<ul style="list-style-type: none"> <li>Researchers send reports on study results to all participating study schools</li> <li>Researchers present results to the PE Department</li> </ul>
Aug 2011	<ul style="list-style-type: none"> <li>DPH holds public forum where researchers present results of study to district teachers and principals</li> </ul>
Dec 2011	<ul style="list-style-type: none"> <li>Alliance presents study results to District Administrators, including Assistant Superintendents and District Research Department</li> </ul>
Jan 2012	<ul style="list-style-type: none"> <li>Alliance presents study results to the Board of Education</li> </ul>
Feb 2012	<ul style="list-style-type: none"> <li>Alliance holds a press conference at a school site to publically share results of the study</li> <li>DPH/PE Advocates release report on study results and increasing access to physical activity in school</li> <li>Alliance presents study results at meetings with all District elementary school principals</li> </ul>
May 2012	<ul style="list-style-type: none"> <li>Screenings of video case studies created by DPH to highlight successful elementary PE programs in District at schools and local sports store</li> </ul>
July 2012	<ul style="list-style-type: none"> <li>Alliance decides to conduct follow-up study in elementary schools</li> <li>DPH screens video case studies at local health forum</li> </ul>
Aug – Dec 2012	<ul style="list-style-type: none"> <li>DPH and PE Department secure funding for the follow-up study</li> </ul>
Sept 2012	<ul style="list-style-type: none"> <li>PE Department meets with Associate Superintendents about PE</li> <li>DPH press release on PE video case studies at District PTA meeting</li> </ul>
Nov 2012	<ul style="list-style-type: none"> <li>PE Department holds professional development meetings on PE with elementary school principals and showed video case studies</li> </ul>
Feb-May 2013	<ul style="list-style-type: none"> <li>Follow-up study takes place in elementary schools in the school district</li> </ul>
Mar 2013	<ul style="list-style-type: none"> <li>PE Department meets with Associate Superintendents about PE</li> </ul>
Aug 2013	<ul style="list-style-type: none"> <li>Alliance will convene to discuss follow-up study results and determine next steps</li> </ul>

Abbreviations: DPH (Department of Public Health); PE (Physical Education)



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**Table 2: Description of alliance members, principals, and teachers interviewed**

	<b>Description</b>	<b>Number</b>	<b>Female N (%)</b>	<b>Years of experience<sup>A</sup> Mean (range)</b>
Alliance Members	Total	7	6 (86)	6 (3 – 9)
	PE Department	3	3 (100)	6 (3 – 9)
	Assistant Superintendent	1	0 (0)	3
	Department of Public Health	2	2 (100)	7 (5 – 9)
	University researcher	1	1 (100)	7
Principals	Total	20	12 (60)	6 (1 – 18)
	Principal	19	11 (60)	6 (1 – 18)
	Assistant Principal	1	1 (100)	7
Teachers	Total	50	30 (60)	7 (0.5 – 27)
	PE teacher <sup>B</sup>	6	2 (33)	4 (1 – 6)
	PE consultant <sup>C</sup>	10	2 (20)	5 (0.5 – 10)
	Classroom teacher (5 <sup>th</sup> grade)	18	11 (60)	8 (1 – 22)
	Classroom teacher (2 <sup>nd</sup> grade)	16	14 (88)	9 (0.5 – 27)

<sup>A</sup> Number of years working in same or similar capacity as teacher, principal, school administrator, district administrator, DPH, or University researcher

<sup>B</sup> A credentialed PE teacher hired by the school-district

<sup>C</sup> A non-credentialed PE teacher hired by the school



# 2014 ALR Annual Conference CONCURRENT PRESENTATION ABSTRACTS

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## **Quantifying the Full Costs of School Transportation: The Economic Case for Siting Schools to Promote Active School Travel**

*Noreen McDonald, PhD<sup>1</sup>, Ruth Steiner, PhD<sup>2</sup>, Mathew Palmer, MCP<sup>1</sup>, Benjamin Lytle, BA<sup>2</sup>*

*<sup>1</sup>University of North Carolina at Chapel Hill, <sup>2</sup>University of Florida*

**Focus Area:** Practice/Policy

### **Background and Purpose**

In the United States, \$21.7 billion is spent annually on busing elementary and secondary students to and from school. This amounts to 4.2% of the total funds spent on public education in grades K-12 (U.S. Department of Education, 2011). Declining state and local revenues have made it imperative for school districts to manage transport costs, thereby preserving funding for classroom activities without sacrificing students ability to get to school. Students living within one mile of school are ten times more likely to walk or bike to school than those living more than a mile away (McDonald, et al. 2011). Yet school districts and municipalities regularly make decisions about where to site new schools and make investments in existing schools without fully understanding the impact of these decisions on overall transportation costs. Thus, the fact that current school location optimization algorithms only consider the cost of busing children to school is significant. This approach fails to recognize opportunities to locate schools in places that maximize active transportation potential and to consider tradeoffs between land values and transport costs.

The goal of this study is to document the full cost of getting children to school and develop a decision support tool to help transportation and school planners minimize transport costs when siting or improving schools. The multi-modal transportation costs are being rigorously studied at elementary schools in Florida and North Carolina. The variation in costs will be analyzed in relation to the school's location type and its proximity to students. This will allow the researchers to develop a pilot decision support tool to estimate transportation costs of potential school sites.

This study will provide the first published evidence regarding the full cost of school transportation across all modes and including upfront and ongoing costs. This quantification will allow researchers and practitioners to consider how school site selection, investment in pedestrian and bicycle infrastructure near the school, and local residential development patterns impact costs. A better understanding of these costs will allow practitioners to economically justify siting decisions which consider the viability of active school transportation.

### **Description**

The individual capital and operations cost items for each primary mode of transportation—automobile, school bus, bike, and walking—were identified to allow for the consistent collection of data between states and school districts. Eight public elementary schools were selected from Florida representing urban and suburban environments both in areas with high and low densities of student populations. The same criteria were used to select 12 schools in North Carolina, with the addition of four schools representing rural environments. School districts, published reports, and professionals associated with the design and planning of the study schools will be consulted to gather cost and other relevant information. A school site visit was conducted to determine the travel mode split at each study school. Based on these results, the researchers will develop a pilot decision support tool which will assist transportation and school planners in determining estimated transport costs by mode for proposed school locations.



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### **Lessons Learned**

Data collection is currently ongoing. Preliminary findings suggest that schools located in higher density areas have lower school transportation costs and higher active transportation mode shares. The pedestrian infrastructure around schools is another important factor in assessing the likelihood of transport at a school.

### **Conclusions and Implications**

We anticipate documenting variation in school transportation costs in aggregate and by mode based on school location. We hypothesize that schools located in more developed areas will have lower transport costs due to a more compact distribution of students. However, we expect to find schools with more students living nearby have lower transport costs than schools located on parcels away from residential areas. Such a finding would have important implications for practitioners. In general, land at the periphery of communities away from residential development is cheaper. This research will give planners a way to assess tradeoffs between land values and transport costs and potentially justify school siting decisions that incorporate a location's suitability for active transport.

### **Next Steps**

By the time of the conference, analysis of the costs of school transportation data will be complete. The decision support tool will be in development.

### **References**

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### **Support / Funding Source**

This research is being conducted with funding from the Southeastern Transportation, Research, Innovation, Development and Education Center (STRIDE) and Active Living Research.



# 2014 ALR Annual Conference CONCURRENT PRESENTATION ABSTRACTS

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## **Parental Safety Concerns and Active School Commute: orrelates Across Multiple Domains in the Home-to-school Journey**

*Abiodun Oluyomi, PhD<sup>1</sup>, Chanam Lee, PhD<sup>2</sup>, Eileen Nehme, MPH<sup>1</sup>, Diane Dowdy, PhD<sup>3</sup>, Marcia Ory, PhD<sup>3</sup>, Deanna Hoelscher, PhD<sup>4</sup>, Liza Creel, MPH<sup>5</sup>*

<sup>1</sup>University of Texas Health Science Center, <sup>2</sup>Texas A&M University, <sup>3</sup>Texas A&M Health Science Center, <sup>4</sup>The University of Texas School of Public Health, <sup>5</sup>Texas Health Institute

**Focus Area:** Research

### **Background and Purpose**

The growing attention on walking to school (WTS), particularly in developed countries, is grounded in the recognition of the importance of physical activity among children who are adopting increasingly sedentary lifestyles [1]. Physical activity has both a positive, direct effect on children's health and an indirect effect through its role in healthy weight maintenance or weight loss among the overweight [2]. The effect of physical activity on adiposity makes it an essential component in combating the childhood obesity epidemic, and recent studies have documented a positive relationship between WTS and other forms of physical activity [3, 4].

Despite its potential health benefits, rates of WTS have plummeted over the last four decades in the U.S. [5]. Several reasons for this sharp drop have been identified. Two of the most frequently reported barriers to WTS are long distance [6] and safety concerns [7]. Addressing the distance barrier is an important but difficult one, as it requires multi-faceted environmental interventions involving policy changes in land use, school siting, attendance zone, etc. [8]. On the other hand, more readily implementable environmental changes have the potential to address the safety barriers that are related to WTS. While safety concerns are hypothesized barriers to WTS, current research offers little in terms of exploring/explaining the mechanisms through which safety concerns might impact WTS [9]. Therefore, there is need for more focused empirical inquiries into the relationship between these two phenomena.

### **Objectives**

To contribute to the growing yet limited body of literature on safety and WTS, we examined the relationships between WTS and specific measures of road safety (traffic- or pedestrian-related safety concerns) and personal safety (crime-related safety concerns) in a sample of schoolchildren selected from elementary schools across the state of Texas in the U.S. We assessed the associations across multiple environments (home, en-route and school environments) in the home-to-school journey. We also examined the relationships between selected covariates and WTS.

### **Methods**

This cross-sectional analysis examined data from the Texas Childhood Obesity Prevention Policy Evaluation (T-COPPE) project, an evaluation of state-wide obesity prevention policy interventions. All study data were from the survey (n=827) of parents with 4th grade students attending 81 elementary schools across the state of Texas, and living within two miles from their children's schools. Using established and validated survey items, traffic safety and personal safety concerns were captured separately for the three spatial domains: (1) home, (2) en-route to school, and (3) school environments. Parents reported the mode of transportation to and from the school for their children, and answered questions on other potential covariates. Data analysis involved three steps. First, we assessed the relationships between potential covariates and WTS using chi-square tests. Secondly, we examined the relationship between each safety concern variable and WTS, using logistic regression models that produced unadjusted odds ratios. Thirdly, a series of multivariable regression models, controlling for the selected covariates, were performed to examine the association between each safety concern and WTS,





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independent of the influence of the covariates. All regression results were organized separately into the three spatial domains.

### Results

Overall, 18% of parents reported that their child walked to school on most days of the week. For traffic safety, students were more likely to walk to school if their parent reported favorable perceptions about the following items in the home environment: higher sidewalk availability, well-maintained sidewalks and safe road crossings. For the en-route to school environment, the odds of WTS were higher for those who reported "no problem" with each one of the following: traffic speed, amount of traffic, sidewalks/pathways, intersection/crossing safety, and crossing guards, when compared to those that reported "always a problem". For personal safety in the en-route to school environment, the odds of WTS were lower when parents reported concerns about stray or dangerous animals, and availability of others with whom to walk. For the school environment, two traffic-safety variables including sidewalk availability and trees along streets near school were positively associated with WTS, and none of the crime-safety variables were significant.

### Conclusions

Findings offered insights into the specific issues that drive safety concerns for elementary school children's WTS behaviors. The observed associations between more favorable perceptions of safety and WTS provide further justification for practical intervention strategies (e.g., sidewalks, traffic calming devices, crossing guards, stray animal controls) to reduce WTS barriers that can potentially bring long-term physical activity and health benefits to school-aged children.

### Implications for Practice and Policy

Public health practitioners, other professionals, and policymakers can: advocate for more sidewalks and traffic calming devices through Safe Routes to School programs, working with neighborhood associations and city government; advocate for additional transportation funds to be dedicated to bike lanes, sidewalks and other environmental changes that encourage bicycling and walking to school; educate school area residents about proper handling of their pets outdoor; and encourage schools to help parents identify safe walking/bicycling routes to and from school.

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## **Support / Funding Source**

This study was funded by the Robert Wood Johnson Foundation (Grant ID: 64635) and contributions from The Michael and Susan Dell Foundation, The University of Texas School of Public Health, the Texas A&M Health Science Center (TAMHSC).



# 2014 ALR Annual Conference CONCURRENT PRESENTATION ABTRACTS

Perceived Safety and Walking To School

Abstract submitted for presentation consideration at the 2014 ALR conference

Table 1: Relationships between traffic safety and walking to school. Regression Analyses - (Crude and Adjusted Odds Ratios): Texas 4<sup>th</sup> grade students, 2008-2010.

	Crude				Adjusted†			
	N=830	OR	95% CI	p	N=830	OR	95% CI	p
<b>Traffic Safety (Home)</b>								
<b>Sidewalks on most of neighborhood streets?</b>								
No	824	1.00	Ref.	0.000	569	1.00	Ref.	0.001
Yes, a few		1.83	1.12-2.99			<b>2.05</b>	<b>1.05-3.98</b>	
Yes, many		2.38	1.53-3.71			<b>3.10</b>	<b>1.69-5.71</b>	
<b>Sidewalks in neighborhood well maintained?</b>								
No	700	1.00	Ref.	0.029	475	1.00	Ref.	0.049
Yes, a few		1.47	0.90-2.39			<b>2.06</b>	<b>1.09-3.92</b>	
Yes, many		1.88	1.17-3.02			<b>1.96</b>	<b>1.02-3.76</b>	
<b>Safe road crossings in your neighborhood?</b>								
No	774	1.00	Ref.	0.001	534	1.00	Ref.	0.058
Yes, a few		1.84	1.16-2.91			1.58	0.87-2.87	
Yes, many		2.50	1.51-4.13			<b>2.24</b>	<b>1.14-4.37</b>	
<b>Do people walk/bike in your neighborhood?</b>								
No	812	1.00	Ref.	0.356	563	1.00	Ref.	0.200
Yes, a few		1.35	0.66-2.74			1.74	0.59-5.17	
Yes, many		1.62	0.78-3.35			2.39	0.78-7.36	
<b>Traffic Safety (En-route)</b>								
<b>Speed of traffic along route a problem?</b>								
Always a problem	808	1.00	Ref.	0.000	565	1.00	Ref.	0.000
Sometimes a problem		1.68	0.99-2.83			<b>2.62</b>	<b>1.18-5.80</b>	
Not a problem		2.69	1.64-4.42			<b>4.46</b>	<b>2.07-9.61</b>	
<b>Amount of traffic along route a problem?</b>								
Always a problem	800	1.00	Ref.	0.000	558	1.00	Ref.	0.000
Sometimes a problem		2.40	1.41-4.11			<b>2.87</b>	<b>1.36-6.03</b>	
Not a problem		3.66	2.17-6.17			<b>4.95</b>	<b>2.41-10.19</b>	
<b>Sidewalks or pathways a problem?</b>								
Always a problem	795	1.00	Ref.	0.000	554	1.00	Ref.	0.001
Sometimes a problem		1.58	0.85-2.95			<b>1.51</b>	<b>0.67-3.43</b>	
Not a problem		3.35	1.99-5.66			<b>3.00</b>	<b>1.51-5.94</b>	

† Adjusted for: **Socio-demographic** - student's ethnicity, any type of public assistance (family), car ownership (family); **School Policy** - teacher's encouragement to walk/bike (student); **Civic Engagement** - voting (parent), attend governmental meeting (parent), volunteer at child's school (parent); and **Social Integration** - feeling like an outsider in community. **Boldface** type indicates statistical significance in the adjusted models.



# 2014 ALR Annual Conference CONCURRENT PRESENTATION ABTRACTS

Perceived Safety and Walking To School  
Abstract submitted for presentation consideration at the 2014 ALR conference

Table 2: Relationships between personal safety and walking to school. Regression Analyses - (Crude and Adjusted Odds Ratios): Texas 4<sup>th</sup> grade students, 2008-2010.

	Crude				Adjusted†			
	N=830	OR	95% CI	p	N=830	OR	95% CI	p
<b>Personal Safety (Home)</b>								
<b>Do you feel safe walking in neighborhood? ‡</b>								
Never	824	1.00	Ref.	0.986	570	1.00	Ref.	0.634
Some of the Time		1.03	0.59-1.83			1.44	0.67-3.09	
Most/All of the Time		1.04	0.64-1.72			1.27	0.64-2.53	
<b>Do you feel safe riding a bike in neighborhood? ‡</b>								
Never	826	1.00	Ref.	0.777	570	1.00	Ref.	0.373
Some of the Time		0.86	0.48-1.53			0.67	0.29-1.54	
Most/All of the Time		0.84	0.52-1.36			1.04	0.52-2.04	
<b>Safe for child to walk/bike in neighborhood?</b>								
Never/Not very often	802	1.00	Ref.	0.007	559	1.00	Ref.	0.081
Some of the time		1.41	0.86-2.31			1.21	0.63-2.33	
Most/All of the Time		2.01	1.28 3.17			<b>1.89</b>	<b>1.03 3.46</b>	
<b>Afraid when out alone after dark in community</b>								
Disagree	792	1.00	Ref.	0.643	566	1.00	Ref.	0.837
Unsure		0.79	0.48-1.32			0.83	0.43-1.58	
Agree		0.99	0.66 1.50			0.92	0.51 1.63	
<b>Personal Safety (En-route)</b>								
<b>Adults or other children to walk or bike with a problem?</b>								
Not a problem	785	1.00	Ref.	0.000	550	1.00	Ref.	0.000
Sometimes a problem		0.46	0.29-0.74			0.56	0.31-1.00	
Always a problem		0.17	0.09-0.34			<b>0.15</b>	<b>0.06-0.36</b>	
<b>PQ15k Violence or crime a problem?</b>								
Not a problem	799	1.00	Ref.	0.010	555	1.00	Ref.	0.154
Sometimes a problem		0.60	0.39-0.93			0.70	0.39-1.23	
Always a problem		0.44	0.20-0.94			0.42	0.14-1.27	
<b>Stray or dangerous animals a problem?</b>								
Not a problem	808	1.00	Ref.	0.000	563	1.00	Ref.	0.005
Sometimes a problem		0.40	0.26-0.62			<b>0.42</b>	<b>0.24-0.73</b>	
Always a problem		0.75	0.39-1.46			0.59	0.22-1.62	

† Adjusted for: **Socio-demographic** - student's ethnicity, any type of public assistance (family), car ownership (family); **School Policy** - teacher's encouragement to walk/bike (student); **Civic Engagement** - voting (parent), attend governmental meeting (parent), volunteer at child's school (parent); and **Social Integration** - feeling like an outsider in community.

‡ Questions that were answered by the children (students). Otherwise, questions were answered by parents.

**Boldface** type indicates statistical significance in the adjusted models.



# 2014 ALR Annual Conference CONCURRENT PRESENTATION ABSTRACTS

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## Impacts of Objective and Perceived Distance on Walking-to-School Behaviors and Roles of Other Built Environmental Attributes in These Relationships

Xuemei Zhu, PhD<sup>1</sup>, Chanam Lee, PhD<sup>1</sup>, Chia-Yuan Yu, PhD Candidate<sup>1</sup>, James Varni, PhD<sup>1</sup>

<sup>1</sup>Texas A&M University

**Focus Area:** Research

### Background and Purpose

Walking to school is being promoted as a sustainable and healthy mode of school transportation. Relevant studies have identified distance as the most important barrier, which was captured through either objective (e.g., Geographic Information Systems [GIS]) or subjective measures (e.g., parental report). Perception of distance may be influenced by not only the objective distance but also other built environmental attributes such as pedestrian infrastructure, road characteristics (e.g., traffic volume and speed), safety, and visual quality. Discrepancies have been reported between the objective and perceived distance for general walking behaviors. However, to our knowledge, no previous studies on walking to school have included both objective and perceived distance measures in their analyses. Consideration of both measures can facilitate the understanding of the complex factors influencing walking-to-school behaviors. Relevant results can inform school and community development, as well as promotion of walking-to-school behaviors.

### Objectives

This study examined the direct role of objective distance and the mediating role of perceived distance on walking-to/from-school behaviors among elementary school children. It also explored how other built environmental attributes influenced walking to/from school directly and indirectly (through influencing perceived distance).

### Methods

The data came from a parental survey of 6,383 elementary school children in 22 diverse neighborhoods in Austin, Texas. It includes information on students' school travel modes, personal and social factors, and home-to-school travel environment. Perceived distance was captured as a binary variable by asking parents whether they considered the distance to be close enough for their child to walk to school. GIS was used to geocode students' homes and schools, and to calculate the objective home-to-school distance based on the shortest route. Structural equation models (SEM) were estimated to predict walking to/from school using personal, social, and built environmental factors, including both direct and indirect impacts of distance and other built environmental characteristics (Figure 1).

### Results

Among personal and social factors, parental education, car ownership, and availability of school bus service were negative correlates of walking to/from school, while the number of children in household was a positive correlate. For physical environmental factors, perceived distance was a significant mediator between objective distance and walking to/from school. After including perceived distance in the model, the objective distance no longer had a significant direct impact. Instead, it showed an indirect impact, by influencing the perceived distance, which in turn influenced walking to/from school. Perceived distance was influenced by not only the objective distance, but also other built environmental factors, including (1) sidewalk availability and quality, (2) overall walkability (a latent factor captured by convenience of walking to school, maintenance, tree shade, quietness, nice things to see, street lighting, and school zone enforcement), and (3) presence of certain land uses and facilities (busy roads, parks/playgrounds, convenience stores, bakery/café/restaurant, and bus stops) en route to school. Some of these environmental factors (sidewalk availability and quality, overall walkability, and presence of

parcs/playgrounds and bus stops) did not show direct impacts on walking to/from school, despite their indirect impacts.

## Conclusions

These findings revealed (1) the importance of considering perceived distance as a mediator for the impact of objective built environment on walking to/from school, and (2) the significant impacts of not only objective distance but also other environmental factors on perceived distance. Without considering perceived distance, the impact of non-distance environmental factors may be underestimated.

## Implications for Practice and Policy

Although distance is the strongest barrier to walking to school, shortening home-to-school distance is going to take long-term efforts in school planning and community development. Meanwhile, improving other aspects of built environments such as pedestrian infrastructure and overall walkability can be more immediate strategies, and may help increase the distance threshold perceived as walkable.

## Support / Funding Source

This project is supported by a grant from the Robert Wood Johnson Foundation Active Living Research Program.

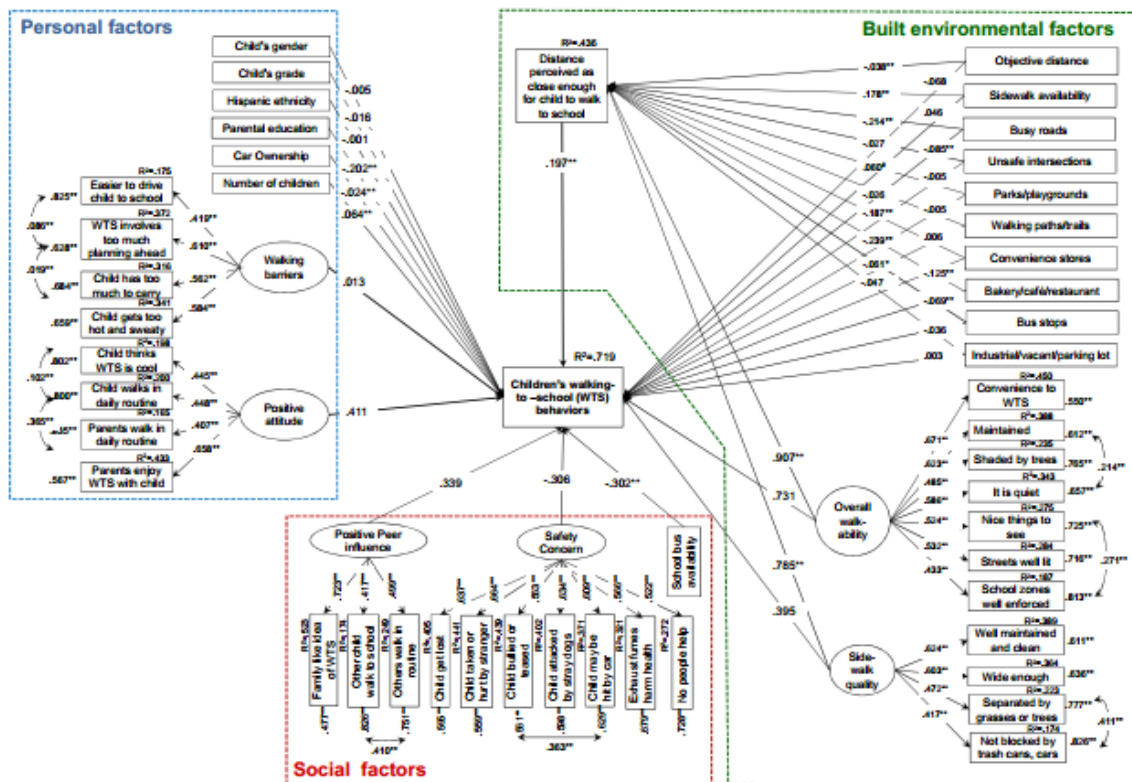


Figure 1. Results of the structural equation model predicting walking to/from school using personal, social, and built environmental factors (including objective and perceived distance) (Note: All coefficients are standardized. #: 0.5 <math>p</math> <math>< 0.1</math>; \*: 0.01 <math>p</math> <math>< 0.05</math>; \*\*: <math>p</math> <math>< 0.01</math>)





# 2014 ALR Annual Conference

## CONCURRENT PRESENTATION ABSTRACTS

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### **The Pros and Cons of the Influence of Joint Use Agreements and Adolescent Physical Activity and Sedentary Behavior**

*Sandy Slater, PhD<sup>1</sup>, Jamie Chriqui, PhD<sup>1</sup>, Frank Chaloupka, PhD<sup>1</sup>, Lloyd Johnston, PhD<sup>2</sup>*

*<sup>1</sup>University of Illinois at Chicago, <sup>2</sup>University of Michigan*

**Focus Area:** Research

#### **Background and Purpose**

Significant disparities in physical activity and sedentariness are observed across demographic factors, including race/ethnicity and gender. Only 25 percent of urban minority youth achieve the daily PA recommendation, and only 48 percent of boys and 35 percent of girls (aged 6-11) obtain 60 minutes of daily PA, with rates declining to 12 percent of boys and just over 3 percent of girls by ages 12-15.

The recent Institute of Medicine report, "Accelerating the Progress in Obesity Prevention" has recommended making schools a focal point for obesity prevention. This focus includes increasing physical activity opportunities before, during and after school hours. As part of this strategy there has been a call to increase joint use or shared use agreements between local communities and school districts. Many communities, especially those with populations at high risk for obesity, lack recreational facilities and the implementation of joint use agreements is one possible policy solution to provide access to recreational space in these park poor neighborhoods.

Research examining the impact of joint use agreements (JUA) on physical activity is limited, but studies show that children with access to existing/renovated school recreational facilities outside of regular school hours are more likely to be active. However, policy strategies are needed to not only increase physical activity, but decrease sedentary activity among youth. Most school districts have JUAs that address recreational use of school facilities, but most of these policies contain vague language or limit the types of shared use and facilities that are available to the public during non-school hours and most assign priority use to school-affiliated groups.

#### **Objectives**

The presentation will examine whether stronger, or more specific JUAs are associated with increased physical activity, as well as decreased sedentary behavior in a national sample of adolescents. To our knowledge, this will be the first national study to examine the association between stronger joint use agreements and adolescent activity behavior.

#### **Methods**

In 2010 and 2011 data on daily physical activity, sports participation (both school and non-school-based/sponsored), and sedentary behavior (T.V., computer, internet, and other electronic media use) were taken from annual cross-sectional nationally representative samples of 8th, 10th and 12th grade public school students in the US. A total sample of 311 school enrollment zones and 35,000 students were included in the analysis. Two JUA scales were constructed using information obtained from hard copies of corresponding school district JUAs and associated JU-related policies. The scales included provision specifying: 1) what groups had access to school facilities; 2) when they could use the facilities; and, 3) what facilities could be used. The first scale gave priority for facility use to school-based programs and the second one to community organizations (e.g., park and recreation departments, YMCAs, etc.).

Multivariate analyses were conducted, controlling for youth and community demographic and socioeconomic characteristics and clustering at the school level. Analyses were also conducted controlling for participation in school-sponsored intramural and extramural sports, as well as the



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availability of park and recreation department-sponsored and private instructional school physical activity opportunities.

### **Results**

Preliminary results showed more specific JUAs, giving priority to either schools or community organizations, were associated with decreased sedentary behavior in adolescents (OR 0.869, CI 0.78, 0.96). JUAs were also associated with an increase in the odds of black adolescents moving from being physically active for at least one hour daily 3 days a week to 4 days a week (OR 1.45, CI 1.15, 1.81). Finally, JUAs specifying that community (vs. school) organizations had priority use of facilities outside school hours were negatively associated with school-based sports participation among females students (OR 0.89, CI 0.82, 0.98), even after controlling for school and community-based availability of physical activity opportunities.

### **Conclusions**

This study provides some of the first initial evidence of the association between joint use policies and adolescent physical activity and sedentary behavior. Results suggest that JUAs can have a positive impact on reducing sedentary behavior and increasing physical activity in certain sub-populations. However, results of this study also suggest that specific provisions in the JUAs could have unintended negative consequences on physical activity opportunities for females; a vulnerable group that has lower levels of physical activity than males, and is in need of creative community-wide strategies to increase activity and reduce sedentary behavior. One possible explanation for these results may be that when community groups have priority use of school facilities, a substitution effect occurs with fewer school-sponsored female sports opportunities being offered.

### **Implications for Practice and Policy**

Results suggest more research is needed to determine the impact, and potential harmful effects more specific JUA provisions may have on vulnerable sub-populations of youth.

### **Support / Funding Source**

The Robert Wood Johnson Foundation and the National Institute of Child Health and Human Development.



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## **Shared Use of School Facilities: A Systematic Observation of Facility Use and Physical Activity**

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**Focus Area:** Research

### **Background and Purpose**

Shared Use (SU) of community facilities for physical activity (PA) is not a new concept (1). However, its resurgence as an efficient and effective way to deliver recreational services comes at a time when researchers, practitioners, and policy-makers have adopted ecological frameworks to develop interventions to increase physical activity (2). Schools have been the most prominent facilities recommended because they are seen as safe, accessible places for physical activity to occur within the community (3). Despite the promise of SU as an intervention strategy, limited objective data exists about their association with facility use and physical activity and overall effectiveness.

### **Objectives**

1. Compare facility use of physical activity settings in schools with shared use to use of physical activity settings in schools without shared use agreements (NSU); 2. Examine whether a SU policy was predictive of children and adults' likelihood to engage in moderate and vigorous PA in school physical activity settings; 3. examine associations among program and environmental correlates and PA levels in those settings.

### **Methods**

A survey of all middle schools within a school district resulted in schools categorized as having no/low Shared Use, Medium Shared Use, and High Shared Use (4). Four schools (2 NSU and 2 SU) were selected for in depth observations based on similar demographic/neighborhood characteristics. Data were obtained from direct observations using the System for Observing Play and Leisure in Youth (SOPLAY) (5). Between March 2010 and December 2010, 3,422 observations (1776 SU; 1646 NSU) of designated school zones were conducted by trained assessors during 3 time periods (6:30-8:30am, 2:30-4:30pm, and 5:30-7:30pm) during weekdays and weekends (8:00-10:00am, 1:00-3:00pm, and 5:00-7:00pm). Each school was observed 3 days during the week during the spring and fall and 1 day per week during the summer. Primary SOPLAY codes accounted for age, gender, and activity level (sedentary, walking, and vigorous), and type of activity. Inter-rater reliability for SOPLAY codes was almost perfect ( $\kappa > 0.89$ ) (6).

Individual users of school facilities and SOPLAY scans served as the units of analysis. First, binomial logistic regression was used to predict the likelihood of facility use based on shared use status at the scan level. Second, t-tests and Chi-Square tests examined associations between levels of usage and levels of physical activity and shared use status at the scan level. Finally, multinomial logistic regression was used to examine associations between individuals' physical activity levels and predictor variables.

### **Results**

Overall, 42,868 users (34,679 SU vs 8,189 NSU) were observed in school designated zones. In SU schools, 37.7% of the users observed were sedentary, 36.6% were moderately active, and 25.7% were engaged in vigorous activity. In non-SU schools, 36.2% of the users observed were sedentary, 40.1% were moderately active, and 23.6% were engaged in vigorous activity. The majority of users observed at schools were children (81% of overall users; 79.4% at SU schools; 86.1% at non SU schools). Among all schools, the majority of use occurred on outside athletic fields (73%) followed by gyms (16%). Shared use facilities were in use approximately 15.7% of the time periods observed, compared with only 8.9% non-



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shared use schools (OR = 1.91,  $p < .001$ ). An examination of user demographics based on SU revealed moderate differences in facility use among adults (OR = 1.57,  $p < .001$ ) and males (OR 1.18,  $p < .001$ ). Regression models indicated no significant association between SU and individual levels of physical activity.

### Conclusions

This study was one of the first to examine the impact of shared use of school facilities on PA levels. Several interesting findings should be noted. First, although shared use schools had significantly more users than non-SU schools, the difference in individual PA levels was negligible. Thus, shared use of schools facilities provided an opportunity for more people to be active, but did not increase levels of physical activity among users.

While SU schools were nearly twice as likely to have their facilities used, that usage was only 15.7%, suggesting they are still under-utilized. Therefore, even schools with SU may have opportunities to offer more access to their facilities by encouraging their use through formal or informal shared use agreements with external community organizations.

Finally, a comparison between use and the physical activity levels between users revealed that shared use seems to support male users and adult users more than females and children. This supports prior research suggesting that organized programming may encourage more girls and adults females to use public facilities (7, 8).

### Implications for Practice and Policy

Policy and programming measures suggested by our data include marketing PA opportunities to nearby residents and other community organizations to maximize the percentage of time facilities are used. To encourage greater use by women and girls, more formal programming should be a priority. The data can also be used to educate and inform citizens, school officials, and other community leaders about how shared use can promote community partnerships, organizational efficiencies and healthy communities.

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### **Support / Funding Source**

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## **After-school Shared Use of Public School Facilities for Physical Activity in North Carolina**

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**Focus Area:** Research

### **Background and Purpose**

Partnerships between schools and other community agencies to share facilities can create new opportunities for afterschool physical activity (PA)[1]. Recently, national organizations (e.g., Institute of Medicine, the American Heart Association, Healthy People 2020, and the CDC) have identified shared use of school facilities as a priority strategy to increase accessible opportunities for physical activity. However, little is known about the current status of shared use across a large sample of public schools. Furthermore, while prior studies have identified potential barriers that prevent community organizations from accessing school facilities [1, 2] much of this research relied on surveys of a cross-section of school administrators or studies of single school districts.

### **Objectives**

The purpose of this study was to a) survey all public schools in a State to determine the current status of shared use in public schools at all levels (elementary, middle, high); and b) examine the common characteristics of school shared use and its barriers.

### **Methods**

A survey instrument was designed from previous research on shared use of school facilities for physical activity [1]. The instrument was piloted with 9 public school administrators in a large urban school district. The final questionnaire included 22 items related to shared use, the specific facilities shared by schools, the type of agreements (formal vs. informal), and common barriers to shared use. All public elementary, middle, and high schools (N=2,359) in North Carolina were surveyed for the study. Each school principal received a pre-survey email from the North Carolina Department of Public Instruction informing them of the forthcoming survey, its importance, and included a request to participate. The survey was distributed by administering an electronic questionnaire through email. Respondents received two reminder emails to complete the survey during the first month of the survey being activated.

### **Results**

Responses yielded 1230 useable surveys (52.1% response rate). 88.8% of respondents (n=1092) indicated that school facilities were used by outside/non-school groups or individuals. The five most commonly shared school facilities were gyms (71.3%), cafeterias (47.1%), baseball/softball fields (34.9%), open spaces (29.7%), and classrooms (26.8%). The most frequently shared facilities at the 694 elementary schools were the gym (68.2%), cafeteria (45.1%), playground (32.4%), and open space (31.6%). Middle schools (n=244) were most likely to share the gym (80.3%), baseball/softball field (50.8%), cafeteria (44.3%), and football field (44.3%) and High schools (n=244) shared the gym (71.3%), cafeteria (54.5%), football field (48.8%), and baseball/softball field (43.1%). Overall, formal written agreements for shared use were more common across all school types and facilities. When shared used occurred, the percentage of formal written agreements for each school type were 57.5% for elementary schools, 63.9% for middle schools, and 59.6% for high schools. Formal written agreements were more common when schools shared use of gyms (73.8%), football fields (68.7%), baseball/softball fields (65.2%), and soccer fields (63.5%). An informal or no agreement for shared use was most common with school playgrounds (65.9%), and track (64.9%). For schools that did not share use of their school facilities (n=135) the most frequent reasons were no outside groups had ever asked to use school



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facilities (46.3%), followed by availability of facilities (12.0%), design of school facilities (10.9%), facility maintenance responsibilities and costs (10.3%), and liability concerns (9.1%).

## Conclusions

Three key findings emerge from the study results. First, the percent of public schools in North Carolina that indicated they currently allow outside/non-school groups or organizations to use their facilities (88.7%) was much higher than previously reported. Lee et al., [3] reported that only 59% of schools in a national survey shared school facilities and Spengler et al., [2] found that 69% of responding schools shared facilities.

Second, although shared use of indoor facilities and athletic fields was governed more frequently by formal written agreements, shared use of school playgrounds and track facilities was more frequently permitted with only informal or no agreement for community use.

Third, unlike previous research that cites concerns related to increased liability and facility maintenance and operating costs as the most frequent barriers to shared use, we found that liability and costs were less frequently reported than lack of community interest in using school facilities and school administrators not knowing where to start.

## Implications for Practice and Policy

Findings may be an indication that schools are becoming more accommodating to shared use partnerships. However, more research on the nature of shared use and types of programs and activities that occur is needed. Community organizations seeking to use indoor school facilities or athletic fields should be prepared to complete a formal written use agreement. Finally, a school history of low or no shared use may not be an indication of a school's unwillingness to allow community use of their facilities. Preconceived notions that schools are unwilling to share their facilities may be preventing community organizations from initiating contact with school administrators.

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## Support / Funding Source

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## **Multimodality and Active Living: Connectivity of the Bus Rapid Transit with Pedestrian and Bicycle Facilities**

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**Focus Area:** Research

### **Background and Purpose**

Multimodal connectivity refers to the movement of people that involves two or more modes of transport in a single journey. Several studies highlight the importance of multimodal travel approach to meet contemporary mobility challenges, such as the need to achieve socioeconomic equity or to reduce environmental impacts associated with urban transportation (Fábio and Fernando 2012). A Bus Rapid Transit (BRT) system can achieve significantly greater CO<sub>2</sub> reductions and encourage active lifestyles if it is planned and implemented with a multimodal approach, integrating walking, bicycling, and car (Vincent and Jerram 2006; Litman 2012). Thus, the focus of this research is to analyze the current transportation infrastructure around stations of a BRT, the Metro Orange Line of San Fernando Valley in Los Angeles and to examine if it is designed to promote multimodality. We observe whether the infrastructure connects pedestrians, cyclists, taxis and car users to each station in a way that encourages multimodal transportation.

### **Objectives**

The aim of this research is to investigate whether, and how, the Orange Line in San Fernando Valley has infrastructure to support a multimodal use of the system. A detailed analysis of pedestrian, bicycle, and auto links to the Orange Line was performed in April and May 2013. Based on the results, some recommendations are presented for enhancing the multimodal connectivity of the BRT for a maximum travel experience.

### **Methods**

The study is based on a structured field observation of the Orange Line's eighteen stations to determine whether they were, or could be, integrated with other means of transportation. Eighteen field evaluation cards were prepared for all the stations. A card includes evaluation criteria for various modes supposedly to be connected to the Orange Line. For integration with the pedestrian mode, the existence of a crosswalk near the station and the quality of the sidewalks within a 350ft radius of the terminal were considered. To analyze the condition of a sidewalk, its width (a good sidewalk being deemed to have a minimum of 4ft width) and the quality of its surface were examined. Terminal accessibility for people with disabilities was also monitored. For bicycles, the presence of bicycle lanes or paths leading to the stops or the vicinity of the terminal was evaluated, as well as availability of bicycle parking. For privately owned cars, the number of parking slots and the presence of park and ride facilities were examined. Once the field data was gathered and compiled, a statistical and spatial analysis was made using statistical software and Geographical Information Systems (GIS) to create a multimodal connectivity index for each station. The index then will be correlated to the socio-demographic and economic background of the area where the station rests.

### **Results**

The calculated Multimodality Index (MI) is adequately differentiated to provide analytical insight. The three stations with the lowest MI were De Soto, Woodman, Valley College and Lauren Canyon. Two of these stations, De Soto and Valley College, are located by the Valley's two major community colleges. Improved multimodal connectivity to the BRT might increase student use of the Orange Line. One sub-index of the MI, the sidewalk rating, averaged 3.64 (out of 5). The stations with the highest rated sidewalks are Warner Center and Sepulveda, with ratings above 4.5. The stations with the lowest



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sidewalk ratings are De Soto, Valley College, and Woodman, with ratings below 2.8. Other sub-indices such as the availability of bicycling facilities, parking lots, kiss-n-ride opportunities and facilities for disabilities indicates that some stations need significant improvements to encourage a multimodal travel experience for BRT users.

### **Conclusions**

The current transportation infrastructure of the Metro Orange Line does not fully promote multimodal connectivity. Increasing multimodal access to each Metro station promotes active transportation in the San Fernando Valley. Pedestrians and cyclists are the primary target because they use healthy, non-motorized modes to access the Orange Line. With regard to private cars, improved connectivity with BRT provides apparent environmental benefits, and can provide some social, and public health advantages.

### **Implications for Practice and Policy**

The proposed research has empirical, conceptual and methodological contributions such as measuring the extent of multimodality of Bus Rapid Transit systems. The application of the analysis method introduced in this study is not limited to the Orange Line but it can be extended to the analysis of any BRT system. Besides, the results of this study would serve as indicator as to whether there is a lack of multimodality for different stations of the Bus Rapid Transit, so the empirical findings of this research will also have important implications for local transit planning.

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### **Support / Funding Source**

This study is supported by a Research Grant from the College of Social and Behavioral Sciences (CSBS), California State University Northridge (CSUN).



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## **Walking for Transportation and Perceived Built Environment Factors Associated with Public Transportation Use in St. Louis, Missouri**

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**Focus Area:** Research

### **Background and Purpose**

Walking for transportation, which can include walking that takes place at the beginning or end of a trip taken by public transportation, can provide individuals with the opportunity to meet recommended levels of physical activity. Previous studies have demonstrated that individuals who walk to and from public transportation stops engage in more daily physical activity than those who do not.[1-5] More evidence is needed, however, to better understand the relationship between walking for transportation and public transportation use and more specifically, the mechanisms through which this relationship occurs.[5] A growing body of evidence has also suggested that perceptions of built environment characteristics can influence walking for transportation.[6-8] Despite this evidence, little is known about how these perceived environmental factors influence public transportation use.

### **Objectives**

The aims of this study were to: (1) further assess the relationship between individual factors, public transportation use, and walking for transportation, specifically in a low-income community of color; and (2) examine the association among individual and perceived environmental factors and public transportation use.

### **Methods**

This cross-sectional study was conducted in 2012. We used questionnaire data from 772 adults living in St. Louis, Missouri. We used the International Physical Activity Questionnaire long form to assess walking for transportation and public transportation use. The abbreviated Neighborhood Environment Walkability Scale was used to examine perceptions of the environment. Two different models were tested using multinomial logistic regression with walking for transportation and public transportation use as the outcome variables. Model 1 examined the association between individual factors and public transportation use with walking for transportation. Model 2 examined the association between individual and perceived environmental factors with public transportation use.

### **Results**

Most participants were women and adults less than 50 years old. The majority of the sample was employed outside of the home and 27% had an annual income less than \$10,000.

Multinomial logistic regression analyses revealed that the odds of walking for transportation for 1-149 minutes/previous week and ≥150 minutes/previous week (OR=2.11, CI=1.31-3.40 and OR=2.08, CI=1.27-3.42, respectively) were higher for individuals who reported using public transportation 1-4 days in the previous week in comparison to individuals who did not use public transportation. Similarly, the use of public transportation for five or more days in the previous week was positively related to walking for transportation. Compared to individuals who did not use public transportation, individuals who used public transportation for five or more days in the previous week were 3.47 times more likely to walk for transportation for 1-149 minutes/previous week and 8.61 times more likely to walk for transportation for more than 150 minutes/previous week (CI=1.47-8.19 and CI=3.87-19.20, respectively).

Model 2 revealed that the odds of using public transportation more than once a week (1-4 days/previous week) was greater among individuals between 50-59 years old (OR=1.98, CI=1.06-3.70) in comparison to



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individuals between 18-29 years old. However, adults over 60 years old were less likely to use public transportation five or more days in the previous week (OR=.34, CI=.14-.86) compared to individuals between 18-29 years old. Employed individuals were less likely than unemployed individuals to use public transportation more than once a week (1-4 days/previous week: OR=.56, CI=.35-.92).

Participants who reported high traffic speed and high crime in their neighborhood were less likely to use public transportation. More specifically, individuals who reported that traffic exceeded the posted speed limits in their neighborhood were less likely to use public transportation for 1-4 days in the previous week (OR=.54, CI=.36-.81) compared to those who did not report high traffic speed in their neighborhood. Similarly, individuals who perceived high crime in their neighborhood had lower odds of using public transportation for more than five days in the previous week (OR=.50, CI=.28-.87) compared to those who did not report high crime.

### Conclusions

Using a diverse sample of adults where many participants were unemployed and used public transportation as their primary mode of transport, we found that individuals that use public transportation more frequently are more likely to meet physical activity recommendations by walking for transportation. Our study results are consistent with earlier research demonstrating that regular public transportation use is associated with increased physical activity and that walking for transportation appears to occur in combination with public transportation.[1-5] Of the perceived environmental factors assessed, our study results indicated that high traffic speed and high neighborhood crime were negatively associated with public transportation use. To our knowledge, no studies to date have investigated the relationship between perceived built environment attributes and public transportation use.

### Implications for Practice and Policy

Programs, policies, and infrastructure changes to improve the perception and actual safety from traffic and crime may be an important investment to increase public transportation use in similar urban communities, and thereby increase levels of walking.

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## **Support / Funding Source**

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## Age Variations in Correlates of Utilitarian Walking among Small Town Residents

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**Focus Area:** Research

### Background and Purpose

Utilitarian walking (e.g., walking for transport) can be readily incorporated into daily routines and can promote health. Walking may hold additional significance for older adults<sup>1</sup> because of its documented role in reducing the risk of functional disabilities<sup>2</sup>, cognitive impairment<sup>3</sup>, and fall injury<sup>4</sup>; and in improving sleep quality,<sup>5</sup> physical fitness, and mental health<sup>6</sup>. Thus, walkable neighborhoods can contribute to healthy aging and aging in place<sup>7</sup>. Over 25% of older adults in the United States<sup>8</sup> reside in smaller communities and rural towns<sup>9</sup>, but studies of walking among older adults have focused on those who live in urban communities. This study explores how small towns in rural areas and their specific features contribute to utilitarian walking among elderly residents<sup>10, 11</sup>.

### Objectives

This study examined relationships between neighborhood environmental characteristics and utilitarian walking in a sample of adults from small towns in rural areas in three geographically dispersed regions of the US. It specifically focuses on how these relationships differ for adults over the age of 65 and younger. Both objectively measured (Geographic Information System, GIS) and subjectively measured (survey) environmental variables were evaluated as potential correlates of walking.

### Methods

The study locations included nine small towns in rural areas geographically isolated from metropolitan areas in three regions: Washington State, Texas, and the Northeast. Telephone surveys of randomly sampled adults asked about demographics, race and ethnicity, health and socioeconomic status, walking barriers and facilitators, behavioral factors, and neighborhood perceptions. The sample of 2,140 respondents were categorized as younger (18-64 years of age, N=1,398) and older (65+, N=742) adult groups.

GIS data obtained from a variety of secondary sources included seven domains: generalized land use, destination land use, residential and employment density, transportation infrastructure, economic environment, regional location, and natural environment. Area-based neighborhood measurements were taken within a 1-km street-network buffer around each survey respondent's home. All proximity measures were captured as the shortest street route distance from home to each target location.

Multivariate logistic regression models were developed separately for the two age categories to identify significant predictors of neighborhood walking (the odds of walking at least once a week in the neighborhood for utilitarian purposes). Statistical significance in this study was defined as  $p < 0.10$ .

### Results

Three personal variables were associated with walking in both age groups: female gender (-), household income (-), and recreational walking (+). Only one additional personal variable, age (-), was associated with walking among younger adults only, while five more variables were significant in the older adult model: education (+), difficulty in walking (-), screen time (-), lack of time as a perceived barrier to walking (+), and ease of walking to retail, services and transit as a reason to choose their current residence (+).





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Only one environmental variable, perceived presence of crosswalks and pedestrian signals, was significant in both age groups as a positive correlate of walking. Among older adults, perceived presence of unattended dogs, sidewalks/shoulders, and good lighting were positive correlates, and distance to religious institution and slope were negative correlates of walking. For younger adults, perception of slow traffic speed; cultural, entertainment and recreational land use; intercity transit stops (local transits not considered due to limited availability); and schools within the 1-km buffer were positively associated with walking, while resource production/extraction land use and mall within the buffer were negatively correlated with walking.

### Conclusions

This study showed significant differences in correlates of utilitarian walking among younger versus older adults; and also differences from existing studies carried out in urban communities. For example, compared to younger adults, older adults were more likely to perceive such conditions as unsafe crossings, lack of sidewalks, insufficient lighting, and steep slope as barriers to walking. Further, compared to urban settings, differences were also found in the roles of specific land uses (e.g. religious institutions) as attractors or deterrents of walking in rural settings.

### Implications for Practice and Policy

This study demonstrates that environmental and policy interventions need to be tailored to the age group as well as the geographic location (rural versus urban) of the target community. To promote utilitarian walking among older small town residents, who are an important target population for healthcare and physical activity promotion, improving street crossing safety by providing clearly marked and signaled crosswalks, improving lighting conditions, providing completed sidewalks/shoulders, controlling attended dogs, and keeping flat/gentle slope in neighborhood streets appear warranted.

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## Support / Funding Source

This study was supported by a grant from the National Institute of Health (1R01HL103478-01A1).

**Table 1 Correlates of Neighborhood Walking among Younger versus Older Adults**

Older Adults model: Obs.:548 | Pseudo R<sup>2</sup>: 0.2261 | AIC: 589.1184 | BIC: 653.7125  
 Younger adults model: Obs.:1207 | Pseudo R<sup>2</sup>: 0.1955 | AIC: 1000.963 | BIC: 1077.4016

Domain	Variable	Older Adults				Younger Adults			
		Odds Ratio	P-value	95% CI		Odds Ratio	P-value	95% CI	
				Lower	Upper			Lower	Upper
<b>Personal Variables:</b>									
Demographics (Survey)	Gender (Female vs. Male, ref.)	0.513**	0.003	0.329	0.799	0.527**	0.000	0.374	0.742
	Age (years)					0.974**	0.001	0.959	0.989
Health status and SES (Survey)	Education (7 ordinal categories)	1.332**	0.004	1.094	1.623				
	Income (9 ordinal categories)	0.850**	0.026	0.737	0.981	0.920*	0.057	0.844	1.002
	Difficulty in walking (Others vs. Not at all or a little difficult, ref.)	0.273** *	0.000	0.150	0.496				
Behavior (Survey)	Recreational walking (7 ordinal categories based on hrs./week)	1.342** *	0.000	1.196	1.506	1.467** *	0.000	1.330	1.617
	Screen time (hrs./week)	0.978** *	0.004	0.963	0.993				
Walking barrier	Lack of time	2.254** *	0.002	1.355	3.747				
Residential self-selection (Survey)	Ease of walking to retail and services and transit	1.735**	0.033	1.044	2.884				
<b>Environmental Variables:</b>									
Neighborhood perception (Survey)	<b>Unattended dogs</b> are problems in my neighborhood.	3.071** *	0.002	1.532	6.158				
	My neighborhood is <b>well lit</b> at night.	1.648**	0.029	1.052	2.584				
	There are <b>crosswalks and pedestrian signals</b>	1.806**	0.012	1.139	2.863	1.713** *	0.002	1.224	2.397
	There are <b>sidewalks or shoulders</b> .	1.486*	0.098	0.929	2.377				
	The <b>speed of traffic</b> on most nearby streets is usually <b>slow</b> .					1.537**	0.016	1.084	2.179
Objective built environment (GIS): <i>Generalized land use</i>	% of <b>resource production/ extraction</b> within buffer:					0.590**	0.010	0.394	0.882
	>0-3% (ref.: 0%)								
	3+ % (ref.: 0%)					0.355** *	0.000	0.229	0.551
	% of <b>cultural, entertainment and recreational</b> within buffer:								
	>0-1.5% (ref.: 0%)					1.538*	0.058	0.985	2.402
1.6-4.0% (ref.: 0%)					2.058**	0.004	1.264	3.352	
4.1+ % (ref.: 0%)					1.589*	0.083	0.941	2.683	
Objective built environment (GIS): <i>Transportation</i>	Total number of intercity <b>transit</b> stops within buffer					3.498**	0.011	1.330	9.198
Objective built environment	Shortest distance to the closest	0.521**	0.009	0.319	0.850				



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(GIS): <i>Destination land use</i>	<b>religious institution</b> (1,000+ vs. ≤1,000, ref.)	*				
	Total number of <b>schools</b> within buffer	1.224** *	0.007	1.056	1.418	
	Presence of all <b>malls</b> within or touching (intersecting) the buffer (2-cat)	0.601**	0.022	0.388	0.931	
Objective built environment (GIS): <i>Natural Environment</i>	<b>Mean slope</b> within buffer (2-cat: 8.33+ vs. 0 – 8.33 (ref.))	0.334**	0.049	0.112	0.995	

\*\*\*p<0.01, \*\*0.01≤p<0.05 \*0.05≤p<0.1



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## Effects of Short Bouts of Structured Physical Activity on Preschooler's During Preschool-day Physical Activity Level

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**Focus Area:** Research

### Background and Purpose

The preschool years (2.9–5 years) have been identified as a critical time to intervene on physical activity (PA), since children begin to form their PA habits during this time frame (1). To date, most of PA studies have focused on changing the outdoor play environment and have rarely focused on changing the PA level during the classroom setting. Additionally, most studies do not take into account the intermittent nature of preschoolers play patterns (2). A recent review of the literature indicates that the duration of most PA interventions in preschoolers ranges between 30 - 45 minutes per session (3). There is research that suggests that these long duration PA interventions may not be effective for young children. Within a 30-minute recess period, most children tend to accumulate the majority of their moderate-to-vigorous PA (MVPA) during the first 10 minutes of play, with the remaining 20 minute spent in sedentary to light intensity activities (4). The longer children participate in a given game or activity (structured or unstructured), the less activity they accumulate during the entire period of the activity (4). Shorter bouts in PA (e.g. <= 10 minutes in duration per session) have been shown to be a successful strategy for improving children's PA, body weight, and academic performance (5-7). The majority of these studies have been in elementary school age children. The intermittent nature of preschoolers' play patterns suggests that short bouts of activity implemented during the preschool day may be beneficial to PA levels.

### Objectives

This study examined the effects of short bouts of structured PA (SBS-PA) implemented within the classroom setting as part of designated gross-motor playtime on during-school PA in preschoolers.

### Methods

The Short bouts of Exercise for Preschoolers (STEP) study was a six-month cluster-randomized study. Ten preschool centers serving low-income families were randomized to receive the SBS-PA (n=5) intervention or continue to follow their usual preschool center gross motor playtime activities (unstructured PA (UPA), n=5). Preschool centers were stratified by school size. Although all children within a preschool were exposed to the assigned study condition (SBS-PA or UPA), children within each preschool center were separately recruited to participate in study-related PA assessments. Children were not eligible to participate in PA assessments if they had a condition limiting their participation in MVPA, a condition limiting participation in other portions of the assessment, or if their parent/guardian was unable to read, understand, or complete the informed consent.

The Tutti Fruitti Instant Recess (TFIR) intervention was adapted for preschoolers from the Instant Recess® (IR) program originally designed for adults (11,12). TFIR is 10-minute PA routines that are designed to engage participants in MVPA by engaging major muscle groups in the upper and lower body. TFIR routines, which are available on DVD, are set to music and designed to be led by teachers (who are watching the video); preschool students follow the teachers rather than watching the video. For the current study, teachers were instructed to implement TFIR during the first 10 minutes of their usual 30-minute gross motor playtime. For the remaining 20 minutes students engaged in unstructured play. Sixteen TFIR DVDs were rotated weekly throughout the 6-month study; each video was viewed for a total of three weeks during the course of the study. The UPA consisted of traditional long bouts (30 minutes) of unstructured gross motor playtime with typical play equipment. SBS-PA and UPA teachers were asked to repeat their assigned intervention during the morning and afternoon gross motor playtimes, five



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days/week for six months. Children's PA was assessed with accelerometers (Actigraph) and direct observation (Observational System for Recording Physical Activity in Children-Preschool Version (OSRAC-P)).

## Results

Data was collected in 291 participants (SBS-PA, n=141; UPA, n=150). Participants were  $4.1 \pm 0.8$  years of age with BMI percentile of  $68.5 \pm 26.7$ . Study fidelity data indicated that classroom teachers only partially implemented the study as designed. Approximately, 95% of SBS-PA classroom teachers implemented the TFIR DVDs during the first 10 minutes of gross motor playtime. However, only 49% of the SBS-PA classroom implemented the 20-minute gross motor (free playtime) portion of the intervention following TFIR. When gross motor time was implemented it lasted for less than 20 minutes. Compared to baseline, intervals spent in light activity significantly increased in SBS-PA group but did not change in the UPA group. In the SBS-PA group, percent of intervals spent in MVPA increased from baseline to 3-months then decreased at 6-months to baseline values. In the UPA group, percent of intervals in MVPA decreased between baseline and 3-months then increased back to baseline values at 6-months. Significant group by visit interaction was observed for percent time spent in total preschool day MVPA.

## Conclusions

The implementation of short bouts of PA can potentially improve preschoolers PA during their classroom setting.

## Implications for Practice and Policy

Preschool PA policies needs to be set taking into account the intermittent nature of preschoolers' play patterns.

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## **Supporting Preschool Active Living Through Built Environment Interventions: Outdoor Design Research-Based Indicators**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

Prevalence of sedentary lifestyles has increased awareness about the importance of environments that children experience everyday, especially those where they spend significant time away from home. Thus, childcare centers have become a focus of research regarding indoor and outdoor design. Early childhood providers realize that physical changes in play areas are required to promote active lifestyles and introduce children to edible plants, and consequently are seeking help from landscape architects/designers/contractors to physically enhance their sites. However, the lack of evidence-based design guidelines (Moore & Cooper Marcus, 2008) offers an inadequate design decision-making/policy environment. Consequently, action is not taken or functionally limited improvements are executed mainly limited to the addition of manufactured play equipment. Meanwhile, nationally the children and nature movement has gained traction to the point where childcare providers are realizing that cost-effective naturalization strategies can extend the functionality and motivational power of the outdoor environment to increase both physical activity (PA) and gardening opportunities.

In 2007 North Carolina Division of Child Development replaced “playground” with “outdoor learning environment” (OLE) in the licensing rules. However, current quality assessment scales used for childcare licensing [Harms et al, 1998; Harms et al., 2006]] deal almost exclusively with indoor environments and provide insufficient guidance for outdoor development. As an effort to improve childcare center quality, including OLE, Shape NC was launched in 2011, as a multi-sector, comprehensive intervention to counteract obesity and sedentary lifestyles, coordinated by the NC Partnership for Children. Partners include the Natural Learning Initiative (NLI, known in NC as purveyors of Preventing Obesity by Design (POD), NC State University; Be Active Kids®, a signature program of the BCBSNC Foundation focused on early childhood PA; and the Center for Health Promotion and Disease Prevention, UNC Chapel Hill, developers of Nutrition and Physical Activity Self Assessment for Child Care (NAPSACC). The objective of this presentation is to share the development, use, and preliminary results of the OLE best practice indicators (BPI) developed by NLI for Shape NC to assess OLE efficacy and to provide a research-based tool usable by landscape professionals to guide design of preschool OLE layout and setting function (Moore, 1978).

### **Description**

The BPI constitute a set of criteria to assess preschool OLE quality in support of health outcomes such as increased PA, food awareness, outdoor comfort, and reduced UV radiation exposure. The BPI evolved from several prior research initiatives: the NC Statewide Baseline Survey; the Preschool Outdoor Environment Assessment Scale (POEMS, DeBord et al. 2005); a study of 30 OLEs in NC used behavior mapping to assess design-related OLE functions (Cosco et al, 2010) and layout-PA associations (Smith et al, under review); and evaluation of 27 POD centers (Cosco et al, under review) demonstrating how specific design parameters influence PA. Indicators were identified based on these studies and offer information at a level of detail appropriate to design practice (see attached table).

### **Lessons Learned**

Annual assessments filed by Shape NC participating centers (N=20) over a three-year period show that the indicators served as guiding principles to create designs and action plans, develop sites, establish a common language among all involved, break the indoor vs. outdoor early childhood paradigm, and





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support longer time outdoors. Preliminary results of Shape NC assessments and policy implications will be shared (project end date: December 2013).

### **Conclusions and Implications**

Like most states, NC childcare is a highly regulated and policy driven system. However, NC also exercises high evidential standards. Arguments for change must be at least “evidence-informed” if not “research-based.” With this in mind, sponsored by NC DCDEE, in 2011 NLI trained 200 state regulators, licensing consultants, and environmental assessors on outdoor learning environment design and management. The project Advisory Board produced recommendations for OLE additions to the licensing rules and procedures now being considered by an internal NC DCDEE OLE committee. Furthermore, the NC Quality Rating and Improvement System – QRIS (DCDEE, 2012) currently under review now acknowledges the OLE as an “area of specialization” eligible to earn Specialization Points and designated DCDEE “Program of Distinction” at the highest level of qualification.

### **Conclusions OR Next Steps**

Work continues with DCDEE to substantiate the standing of OLE as a health promotion strategy, including measurement quality. Meetings with regulators, environmental assessors, and sanitation agents have refined OLE best practices, dispelled myths, and gathered support from multi-sector state authorities. In parallel, the project Preventing Obesity by Design POD3 (cubed) was launched in 2012 to impact a larger proportion of the nearly 5000 licensed childcare centers by transferring knowledge, building capacity, and extending reach. Interdisciplinary OLE education modules are being developed for delivery through community college programs in early childhood education, culinary arts, physical education, and landscape design/construction technologies. “OLE lab sites” serve as training and on-going research and demonstration best practice hubs linked to regional symposia bringing multi-sector audiences together to create “networks of excellence” to guide creation of OLEs that meet BPI.

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### **Support / Funding Source**

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**Figure 1. Best Practice Indicator Criteria**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Diversity of trees, shrubs</li> <li>2. Shade</li> <li>3. Ten settings or more</li> <li>4. Wide looped or double looped path</li> <li>5. Grassy area, large enough for a group of children</li> </ol> | <ol style="list-style-type: none"> <li>6. Vegetables, fruit trees, and fruiting vines within the OLE</li> <li>7. Designated vegetable garden</li> <li>8. Natural materials</li> <li>9. Outdoor toys</li> <li>10. Settings for a variety of gross motor activities</li> </ol> |
|--|--|

**Examples: Criteria 4. and 5.**

Level	1	2	3	4
<p><b>Item 4.</b> In your center's outdoor learning environment, what kinds of paths are available for children to use wheeled toys in the outdoor learning environment?</p>	No path.	A straight linear path, but it is less than 5 feet in width and is not connected to the building	A circular path less than five feet wide	A curved looped or double looped path five feet wide that is connected to the buildings & settings
<p><b>Item 5.</b> Is there an open, grassy area for games, activities and events?</p>	There is NO grassy area	There is a small grassy area, large enough for approx. 6-8 children	There is a medium-sized grassy area, large enough for approx. 9-15 children	There is a large grassy area, big enough for 25 or more children



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## **School Gardens & Physical Activity: A Randomized Controlled Trial in Low-Income Schools**

*Nancy Wells, PhD<sup>1</sup>, Beth Myers, MPH<sup>1</sup>, Charles Henderson, MS<sup>1</sup>*

<sup>1</sup>*Cornell University*

**Focus Area:** Research

### **Background and Purpose**

Recently, school gardens have begun to move from niche to norm as a strategy to promote public health (Severson, 2010; Otterman, 2010). However, despite growing interest, few studies have examined the effects of gardens on children's health or health behaviors. Evidence suggests that gardens may positively influence children's diet-related outcomes such as vegetable consumption, vegetable knowledge (Morris, Briggs & Zidenberg-Cherr, 2002), willingness to taste vegetables (Morris, Neustadter & Zidenberg-Cherr, 2001; Morris, Briggs & Zidenberg-Cherr, 2002) but studies of gardens' effects on children's physical activity (PA) are virtually nonexistent.

Despite the dearth of research examining school gardens and PA, the influence of school gardens on children's PA merits study for four reasons. First, preliminary evidence suggests that school gardens have the potential to influence PA (Hermann et al., 2006) and gardening has been linked to PA among adults (Twiss et al., 2003). Second, we know that time spent outdoors is a positive and consistent predictor of PA among children (Ferreira, van der Horst, Wendel-Vox, van Lenthe & Brug, 2006; Sallis, Prochaska & Taylor, 2000). Thus, one strategy to increase PA is to increase time outdoors, enhance children's desire to be outdoors, and thereby compete with the "draw" of indoor activities such as TV and computers. A third argument for gardening as a means to increase PA is that there may be carry-over effects from one context to another — in this case, from school to home. After participating in a community gardening program in San Bernardino, California, the number of students who gardened at home increased by 20% (Twiss et al., 2003). A fourth argument for gardening as a strategy to increase youth PA concerns the initiation of long-term health-related habits. Children and youth in this country are not achieving recommended levels of PA (Pate, Freedson, Sallis et al. 2002). Among children ages 6-11, only 42% achieve the recommended 1 hour of PA per day (Troiano et al, 2007). Consistent with the life course perspective, empirical evidence suggests that life-long habits, including those related to food and PA (DiNubile, 1993), are established early (Elder 1998; Wethington, 2005). Introducing children to gardening may help to shift them from a life course trajectory of sedentary activities toward a positive trajectory of gardening and healthy habits.

### **Objectives**

The objectives of this study are to examine:

1. the effects of school gardens on children's time spent outdoors and physical activity levels during the school day
2. the effects of school gardens on children's general activity and sedentary behavior patterns over time
3. among children in the intervention group, differences in activity and movement patterns while participating in an outdoor, garden-based lesson compared to while participating in an indoor, classroom lesson.

### **Methods**

In a randomized controlled trial, this 2-year study examined the effects of a school garden intervention on elementary school children's time spent outdoors and physical activity. Eight low-income New York State schools were randomly assigned to receive school gardens or to serve as wait-list control schools that received gardens at the end of the data collection period.



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Physical activity was operationalized with three measures. Actigraph GT3X+ accelerometers worn during the school day for three days at each of four waves of data collection indicated children's levels of vigorous, moderate, and light physical activity as well as sedentary activity. Lux measures from the accelerometers provided a measure of children's time spent outdoors. The GEMS Activity Questionnaire (GAQ) (Treuth et al., 2003) documented changes in overall physical activity behaviors over the 2-year period. Lastly, the PARAGON direct observation measure (Myers & Wells, under review) was used to characterize the postures and movement associated with indoor versus outdoor learning.

### Results

Lux readings from the accelerometers indicate that children in the garden intervention group showed an increase in the amount of time spent outdoors during the school day. In addition, accelerometry results indicate the intervention group increased proportion of time spent in moderate physical activity (MPA) and moderate to vigorous physical activity (MVPA) compared to pre-garden baseline and to the non-garden control group. Results from the GAQ suggest that over time, children in the garden intervention are less sedentary in their overall activities than the control group children. Lastly, direct observation data suggest that while participating in a garden-based outdoor lesson, children engage in less sitting and in more walking and standing than while participating in an indoor lesson in the classroom.

### Conclusions

School gardens appear to be a potent intervention to increase children's time spent outdoors as well as the proportion of time spent in MVPA during the school day. Gardens may also contribute to reduction of overall sedentary activities. Lessons delivered in the garden are associated with more movement than are indoor lessons.

### Implications for Practice and Policy

This study provides evidence that school gardens should move from niche to norm in schools throughout the United States, as another strategy in our toolkit to increase physical activity.

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### **Support / Funding Source**

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## **Association of After-school Programs' Contextual Characteristics and Children's Moderate-to-Vigorous Physical Activity and Time Spent Sedentary**

*Morgan Clennin, MPH<sup>1</sup>, Rahma Aja, MPH<sup>1</sup>, Robert Weaver, PhD<sup>1</sup>, Michael Beets, PhD<sup>1</sup>*

<sup>1</sup>*University of South Carolina*

**Focus Area:** Research

### **Background and Purpose**

Nationwide, a majority of youth fail to meet current physical activity (PA) recommendations, making physical inactivity among youth an important public health concern (1). While past research has identified several settings (i.e. schools, home, neighborhood, etc.) that impact youth PA levels (2-3), the afterschool environment has recently emerged as an influential setting with the potential to substantially impact youth PA levels (4). With an estimated 8 million youth (age 5-18 years old) attending ASP in the United States, these programs represent an ideal setting to promote PA among a diverse group of children (5). However, very little is known about ASPs characteristics associated with children's MVPA and time spent sedentary. The purpose of the current study was to examine the relationship between ASP contextual factors, specifically size of indoor and outdoor play space, type of activity (free play vs. organized PA), program length, and MVPA and time spent sedentary among children attending a diverse sample of ASPs.

### **Objectives**

To examine the association of the ASP contextual characteristics and their relationship with MVPA and time spent sedentary while attending an ASP.

### **Methods**

Twenty ASPs across the South Carolina were selected to evaluate the impact of program contextual factors on children's PA levels. A total of 1,302 children (5-12yrs, 53% boys) wore accelerometers for 4 non-consecutive days while attending the ASPs. The physical size of the indoor and outdoor play space ASP used each day were measured via a measuring wheel (indoor) and GIS (outdoor), and inventoried via direct observation. The type of activity was evaluated via direct observation using the System for Observing Staff Promotion of Activity and Nutrition and classified as a ratio of free-play (e.g., children released to play on playground and open green spaces) to organized (e.g., adult-led structured games) activity offerings based on the percentage of observational scans during physical activity time either indoors or outdoors. Time allocated for PA opportunities was determined from each ASPs' daily schedule. PA and sedentary behavior were measured using accelerometers (ActiGraph GT3X models) (6-7). Time (min/d) spent in MVPA and sedentary indoors and outdoors was estimated using built-in light sensors (Lux values) (8). The analysis was conducted only on children attending the ASP for at least 60 minutes on a given day. Children's MVPA and time spent sedentary (min/d) during indoor and outdoor opportunities were evaluated separately in relation to size of the play space, type of activity provided, and amount of time allocated for PA using mixed model regressions.

### **Results OR Conclusions and Implications**

Girls and boys accumulated an average of 18.1 and 24.2min of MVPA/d. When comparing indoor and outdoor MVPA, approximately equal portions of activity were accumulated in each activity location. Girls obtained 9.0min of indoor MVPA/d (49.7%) and 9.1mins of outdoor MVPA/d (51.3%), while boys accumulated 12.4min of indoor MVPA/d (51.3%) and 11.8min of outdoor MVPA/d (49.7%). Regarding outdoor MVPA, each additional acre of play space was associated with a 2.8 and 1.5 min/d increase in outdoor MVPA for boys and girls, respectively, and a 2.1 min/d increase in outdoor sedentary behavior for boys. A higher free-play to organized activities ratio was associated with a 3.5 and 3.0 min/d increase in outdoor MVPA for boys and girls, respectively. Examining indoor activity levels, a higher ratio of free-play





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to organized activities was associated with a 2.4 min/d increase in indoor MVPA for boys. Time spent sedentary indoors increased by 0.5 and 0.7 min/d with each additional increase in 1,000ft<sup>2</sup> of indoor activity space for boys and girls, respectively, while a higher free-play to organized activities ratio was associated with a 5.5 and 8.3 min/d increase in indoor sedentary behavior for girls. Length of time allocated for PA during the ASP was unrelated to MVPA and time spent sedentary.

### Conclusions

These findings suggest limited influence of the physical size of play space on children's MVPA and sedentary behaviors during an ASP and that modifiable programmatic structure, in the form of the type of activity opportunities provided (free-play vs. organized games) was related to both MVPA and time spent sedentary. These are important findings, in that increasing physical play space is not a feasible or realistic strategy for ASPs. Conversely, more children were physically active indoors with the presence of more organized activities, yet this was related to a decrease in MVPA. Thus, future studies should develop effective strategies to increase PA levels by taking into account indoor and outdoor play opportunities.

### Implications for Practice and Policy

While the ASP play space was associated with children's PA, the impact of this was minimal. Additional contextual factors impacting ASP youth PA, such as programming high quality PA experiences, are likely to lead to greater improvements in MVPA and reductions in sedentary behaviors. Policies, therefore, should target the PA programming to ensure children are afforded opportunities to be physically active while attending as ASP.

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### Support / Funding Source

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## **The Impact of Physical Environment and Policy characteristics on Physical Activity Levels of children Attending After-school Programs**

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**Focus Area:** Research

### **Background and Purpose**

Afterschool programs (3 pm – 6 pm, ASP's) are seen as an important setting to combat children's physical inactivity.<sup>1, 2</sup> In recent years, evidence supporting the role of the physical environment and policy-level characteristics on children's physical activity level has emerged.<sup>3, 4</sup> However, the extent to which ASP's physical environment and policy characteristics impact the physical activity level of children attending is unknown.

### **Objectives**

The purpose of this paper is to evaluate the influence of program physical environment and policy characteristics on the physical activity levels of children attending a diverse range of ASP's.

### **Methods**

Twenty afterschool programs across South Carolina serving 1,700 children (5-12 years old) took part in a healthy eating and physical activity intervention. Baseline information for physical activity is presented. Policy-level characteristics were evaluated for the presence of 11 supportive physical activity policy items (i.e. the presence of written policy to promote physical activity, child feedback, screen time, types of physical activity, allocating time for physical activity in the schedule, staff training to promote physical activity and quality of that training, providing activities that appeals to both girls and boys, curriculum and evaluation) using the Healthy Afterschool Program Index-Physical Activity (HAPI-PA).<sup>5</sup> The total score of the HAPI-PA is presented as a continuous measure (0-25) with higher scores indicating a more supportive environment of physical activity. The physical environment was defined as the size of physical activity space used by the ASP's and was determined by the program site director and direct observation. Used indoor physical activity area (ft<sup>2</sup>) was measured using a measuring wheel at each of the 20 's. Estimates of the outdoor spatial area (acre) used for physical activity at each of the ASP's in the study was calculated using Geographical Information Systems software (GIS).

Physical activity was measured using ActiGraph accelerometers (Shalimar, FL) during four non-consecutive days (Monday through Thursday) in the Spring of 2013. Children were fitted with the accelerometers upon arrival at the ASP's and removed prior to program departure. Cut-point thresholds associated with Moderate-to-vigorous physical activity (MVPA) (Evenson cut-points)<sup>6</sup> were used to distil physical activity intensity and sedentary behavior (Matthews cut-points)<sup>7</sup> using 5-seconds epoch intervals. Accelerometer data was included in the analysis if total daily attendance (accelerometer wear-time) was equal to or greater than 55 minutes. The association between the presence of an environmental features and time spent in MVPA and sedentary behavior was calculated using a mixed model regression accounting for multiple measurement days nested within child nested within afterschool program.

### **Results**

The size of the physical activity space used was significantly associated with a change in the amount of time both boys and girls spent in MVPA and sedentary behavior, after adjusting for age, race, BMI, percentage of population (neighborhood) in poverty, time spent in the program, total HAPI-PA score, and scheduled physical activity time. Specifically for every 1000 ft<sup>2</sup> of used indoor activity space, a decrease



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of 2.0 minutes (95%CI -3.9 - -6.5) and 2.1 minutes (95%CI -3.8 - -3.0) of MVPA and an increase of 5.5 minutes (95%CI 2.2-8.7) and 6.5 minutes (95%CI 3.1-9.1) of sedentary behavior was observed among boys and girls, respectively. For every 1 acre of outdoor space used for physical activity, boys and girls showed an increase of 2.5 minutes (95%CI 1.6-3.4) and 1.60 minutes (95%CI 0.8-2.4) of MVPA and a decrease of 3.8 minutes (95%CI -5.4 - -2.3) and 2.5 minutes (95%CI -4.0 - -1.1) of sedentary behavior. No other associations were observed.

### Conclusions

Despite the importance of policy characteristics, the mere presences of these characteristics were unrelated to the physical activity levels of children attending ASP's. Although the size of used outdoor physical activity space was related to higher levels of MVPA, while the amount of used indoor space was associated with lower levels of MVPA, for both boys and girls, the observed change in minutes of MVPA was small.

### Implications for Practice and Policy

The findings of this study have two important implications for improving physical activity of children attending ASP's. First, our results suggest that in the absence of support systems aimed at assisting ASP's with implementation of physical activity policies, supportive policy characteristics are ineffective in increasing the amount of MVPA accumulated by children attending ASP's. Second, our findings suggest that although the change in the amount of MVPA accumulated while at the ASP's was significantly associated with the size of used physical activity space, the magnitude of change in the amount of MVPA accumulated was relatively small for every one unit of increases in the size of physical activity space. Taken together, these findings suggest other more modifiable ASP's characteristics, such as the skills staff have for creating activity-friendly environments, may be more influential to increasing MVPA than policy or physical environmental characteristics.

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### Support / Funding Source

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## **Promoting Physical Activity in Out-of-School Time: Update on the Impact of the National AfterSchool Association Physical Activity Quality Standards**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

The Physical Activity Guidelines for Americans Midcourse Report (1) concluded there was limited evidence that interventions in Out-of-School Time (OST) settings had increased physical activity among children and youth. Our purpose is to describe national, collaborative efforts to change the physical activity environment in OST by promoting use of the five National AfterSchool Association physical activity quality standards (NAA PAQS) (2). These foster programmatic change that can lead to youth behavior change. The first standard addresses PA content and quality, and four additional standards address program capacity including staff training and social, program, and environmental support. NAA PAQS resulted from the authors' work to develop science-based PA and healthy eating practice standards by convening the Healthy Out-of-School Time Coalition (HOST), comprised of influential providers, service intermediaries, and researchers (3). HOST seeks broad dissemination of the NAA standards to promote chronic disease prevention using unified messaging across provider platforms.

### **Description**

We present HOST as a case study of a collaborative convened to promote program and policy change. We will enumerate activities by HOST members to disseminate NAA PAQS and will describe the role of major national organizations including Alliance for a Healthier Generation, National AfterSchool Association, and YMCA of the USA (Y-USA) in championing the standards. Further, we will report on measurement of NAA PAQS awareness and use at the local level. In 2013, we developed an online questionnaire to assess OST sites' awareness, adoption, and use of NAA PAQS; implementation of best practices; and organizational capacity. We piloted the questionnaire among summer programs and will field it for school year programs in October. In July 2013, NAA emailed members an electronic link on 2 occasions. To analyze the data, we created summary scores for implementation of each standard (3 to 9 best practice items per score), and one summary score representing organizational capacity (10 items). Data were collected via SurveyMonkey. The study received IRB approval.

### **Lessons Learned**

The collaborative leadership process HOST uses has yielded far more impact than a single leader project could have achieved. The standards have been adopted by major national organizations and the Council on Accreditation. They are the focus of Y-USA's partnership with RWJF/American Heart Association's Voices for Healthy Kids initiative to improve physical activity in OST. We now have preliminary evidence from the summer survey pilot for local level awareness and impact. School-year survey data will be available for presentation at ALR. For the summer survey, NAA sent links to its members (about 5,000; number of summer program operators was unknown). These yielded 71 responses of which 68 were analyzed. About 70% of respondents were familiar with the NAA PAQS and 47% reported using one or more of them for program planning. We observed several modest but statistically significant associations between respondent characteristics and implementation scores ( $p < 0.05$ ). Familiarity with the NAA PAQS and intentional use of them was associated with higher scores for two standards (PA content and quality; staff training). Accredited sites had higher scores on three standards (social support, program support, environmental support). 21st Century Learning Center sites had higher scores for two standards (staff training; program support). Sites that were part of a parent organization (i.e., YMCA) had higher program



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support scores. Being licensed, an NAA member, and type of facility were not associated with implementation scores.

Organizational capacity to implement the NAA PAQS includes having adequate budget, training, equipment, and staff/parent engagement. A majority of respondents said that 10 positively framed statements about organizational capacity were true or mostly true. Organizational capacity scores were positively associated with implementation scores for all five standards, with correlations ranging from 0.5 to 0.7 ( $p < 0.0001$ ).

### Conclusions and Implications

The NAA physical activity quality standards show promise as a useful lever for changing physical activity policy in after school, before school, and vacation programs. Collaborative leadership has been effective in translating science to practice on a national scale. A pilot online questionnaire provides the first evidence that local sites are familiar with the NAA PAQS and that intentional use of them is associated with modest increments in physical activity quality. Moreover, the association between organizational capacity score and implementation scores supports the use of translational approaches that focus on building capacity.

### Next Steps

Extensive dissemination work by HOST will continue until ALR, and we will report on progress at that time. Preliminary survey data indicate that tracking uptake at the local level is feasible and informative, and we will discuss plans for periodic monitoring. Pilot survey limitations include difficulty establishing a nationally representative sampling frame of OST sites, and lack of data on item validity. Improvements to survey administration, including better tracking of denominators and broader distribution of survey links, will yield additional fall 2013 data from a more representative school year sample. Research on youth behavior change attributable to NAA PAQS is now warranted.

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### Support / Funding Source

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### **Association between Walking, Bicycling and Built Environment Features in Shanghai**

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**Focus Area:** Research

#### **Background and Purpose**

China faces increases in noncommunicable diseases and in obesity, and decreases in walking, bicycling and physical activity. Nearly 25% of Chinese residents are overweight; 3% are obese.<sup>1</sup> In the last two decades, physical activity declined by over 30% among Chinese adults.<sup>2</sup> China is urbanizing rapidly; it will add another 350 million urban residents by 2025.<sup>3</sup> Accommodating this population will require an estimated 170 new mass-transit systems, 5 billion square meters of road, and 40 billion square meters of new floor space.<sup>4</sup> Chinese cities have specific built environment features, attitudes, and behaviors that may shape active living. Limited research examines active living in Chinese cities.

#### **Objectives**

This study identified associations between walking, bicycling, and physical activity and physical environment features for three districts in Shanghai.

#### **Methods**

The three districts included Xintiandi (hypothesized as highly walkable/bikeable), Zhongshan Park (hypothesized as moderately walkable/bikeable), and Lianhua Road (hypothesized as low walkable/bikeable). (Hypotheses were based on the presence of features associated with physical activity in existing research.) Each district was 1 km in area and included a subway station.

We adapted the Irvine-Minnesota Inventory (IMI)<sup>5</sup> environmental audit tool for use in China (now called the IMI-C). Based on a literature review and interviews with Chinese urban developers, we expanded the IMI from 162 to 286 items. Examples of new items include measures of obstruction of sidewalks by vendors or parked cars and visible air pollution. We translated the IMI-C into Chinese and developed it as an iPad application. Working with colleagues from East China Normal University, we conducted the IMI-C on all street segments in each area (N=286), including 129 segments in Xintiandi, 60 segments in Zhongshan Park, and 97 segments in Lianhua Road.

We conducted health surveys of residents in each district, using a modified version of the existing China Health and Nutrition Survey.<sup>6</sup> The survey assessed physical activity levels, Body Mass Index, health status, and aspects of residents' neighborhood environment. Respondents were randomly surveyed outside a grocery store or farmers' market in each district. We conducted 633 surveys, including 129 in Xintiandi, 243 in Zhongshan Park, and 291 in Lianhua Road.

#### **Results**

Data from the environmental audit were analyzed using the "State of Place Index," a proprietary algorithm that calculates an overall "walkability" score composed of eleven sub-scores that measure urban design dimensions empirically tied to walking and bicycling. As expected, we found that Xintiandi was more "walkable" than both Zhongshan Park and Lianhua Road in terms of having more of the built environment characteristics that are associated with walking and bicycling in existing research. Zhongshan Park and Lianhua Road did not differ from each other overall in terms of the walkability of their built environments, but there were important differences in their built environment dimensions that relate to walking and physical activity.





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We analyzed the data from the health survey to understand the relationship between the built environment and physical activity. Respondents in the three districts use different travel modes, including primarily walking in Xintiandi, public transit in Zhongshan Park, and cars in Lianhua Road. Respondents in Xintiandi were the most physically active, spending the longest time on physical activity (for exercise and transportation). Respondents in Lianhua Road were the least active and spent the longest time (51 minutes more) on sedentary activities. Respondents in Zhongshan Park were between the other groups. Also Xintiandi, with the highest State of Place score, had the lowest reported BMI and highest reported rates of physical activity; followed by Zhongshan Park with the next highest State of Place score, next lowest BMI and next highest physical activity rates; and finally Lianhua Road with the lowest State of Place score, highest BMI, and lowest rates of physical activity (See Table 1 and Figure 1).

### Conclusions

Findings are consistent with expectations based on existing research in Western settings. In this highly dense city, the most "urban" district was associated with greatest use of active travel modes and lowest reported BMI, and the most "suburban" district was associated with the greatest use of cars for travel and highest BMI. We are currently collecting additional data on three districts in Hangzhou, to expand environmental variability and the robustness of our findings.

### Implications for Practice and Policy

If findings remain consistent, they will bolster the assertion that future Chinese urban development should seek to adopt active design strategies to support higher rates of physical activity.

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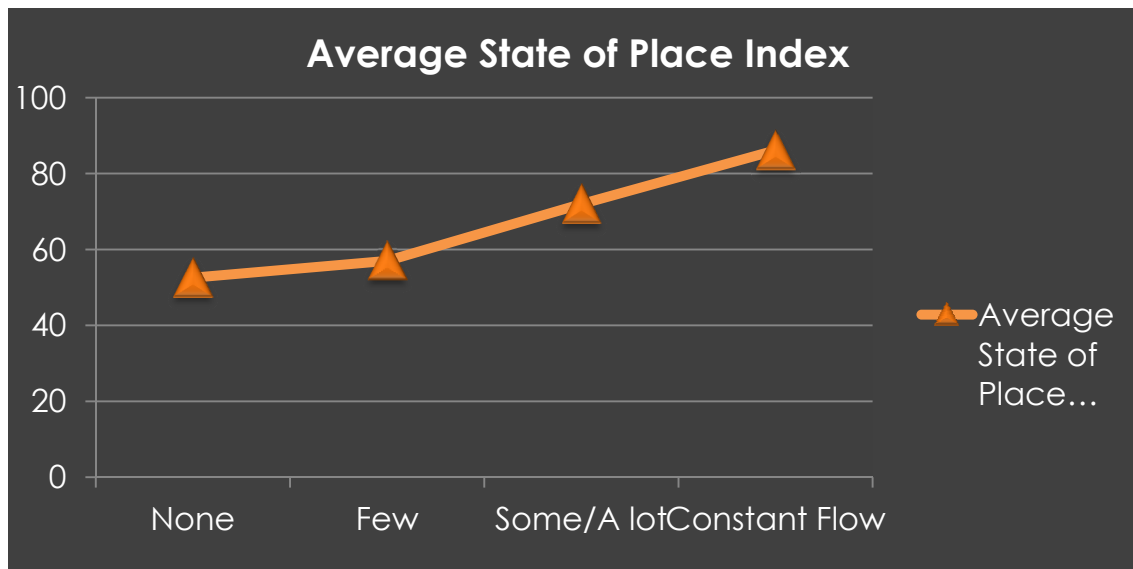
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### Support / Funding Source

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Mode share	Walk 1	Walk 2	Rode bike 1	Rode bike 2	Rode e-bike 1	Rode e-bike 2	Car 1	Car 2	Bus 1	Bus 2
Lianhua	0.14	0.13	0.04	0.04	0.09	0.04	0.12	0.10	0.28	0.35
Xintiandi	0.25	0.35	0.10	0.05	0.03	0.04	0.02	0.03	0.25	0.27
Zhongshan	0.24	0.17	0.08	0.05	0.05	0.03	0.09	0.08	0.37	0.41
P value	0.005	0.000	0.026	0.684	0.029	0.785	0.008	0.054	0.030	0.026

*Table 1. Travel mode for respondents in the three districts. **For each category, 1= travel mode for commuting and 2 = travel mode for non-commuting.***



*Figure 1. Average State of Place Index for each block is associated with the number of observed pedestrians on each block.*



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## **The Impact of a Signalized Crosswalk on Crossing Behaviors in a Low-Income Minority Neighborhood**

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**Focus Area:** Research

### **Background and Purpose**

Communities with predominantly low-income and minority populations are effected by the highest levels of sedentary behavior and obesity (Day, 2006). These underserved communities often have limited access to parks and active transportation resultant of high-speed, high-volume streets and an outdated built environment. While studies suggest that sidewalks, crosswalks, and traffic calming measures can increase pedestrian safety (Pucher & Dijkstra, 2003) few studies have evaluated pedestrian crossing behaviors as a result of infrastructure changes. In 2012-2013, the completion of a signalized crosswalk and landscaped median linking low-income housing with a public park provided a natural experiment to examine the effect of an infrastructure project upon active living behaviors.

### **Objectives**

The purpose of this study was to examine the effect of changes to the built environment to determine whether street crossing infrastructure modifications change pedestrian crossing behaviors or traffic patterns in a low-income and predominately racial/ethnic minority community.

### **Methods**

Data collection occurred at one Intervention site (Providence Road) and one Control site (College Avenue) in Columbia, MO. We selected the Control site by examining relevant characteristics of the neighborhood (e.g., size, income level), and the corresponding street (e.g., number of lanes, typical traffic volumes/speeds, pedestrian crossing facilities). Street crossing behaviors were collected using direct observation and assessed the mode of transportation, legality of the crossing (e.g., at intersections/crosswalks or not), as well as race/ethnicity, gender, and age within 5-6 zones at both sites. Magnetic traffic detectors were also embedded in both the Intervention and Control streets during the data collection to capture traffic volume and speed. Data collection ran concurrently at both sites for seven days (Monday-Sunday) over the same two-week period in June 2012 (pre-intervention) and June 2013 (post-intervention), crossing behaviors were recorded for three hours each day (7:30am, 12:30pm, and 3:30pm) while traffic data were collected continuously for 168 hours during the first week. Descriptive statistics were calculated for all variables. Independent samples t-tests assessed overall changes in pedestrian crossings and traffic volume at each site from 2012 to 2013. Changes in legal/illegal crossings and traffic speed (above the speed limit/below the speed limit) at each site from 2012 to 2013 were analyzed using Pearson's Chi Square.

### **Results**

Total pedestrian crossings at the Intervention site (Providence Road) increased from 1,464 in 2012 to 1,658 in 2013 ( $p < 0.001$ ). Between 2012 and 2013, the number of legal crossings at the Intervention site increased from 553 (38%) to 795 (48%) ( $p < 0.001$ ). In both years, the majority of observations were pedestrians (1,099 [75%], 2012; 1,316 [79%], 2013) followed by bicyclists (332 [23%], 2012; 310 [19%], 2013). Amongst children and teens, legal crossings rose from 45(25%) to 94(61%) and from 90(23%) to 169(41%), respectively between 2012 and 2013 (both:  $p < 0.001$ ). In addition, total traffic volume at the Intervention site fell slightly from 148,857 vehicles in 2012 to 148,508 in 2013 ( $p = 0.01$ ). Motor vehicles that were traveling above the speed limit of 35 mph decreased from 67,922(46%) in 2012 to 51,339(35%) in 2013 ( $p < 0.001$ ).



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There was no change in the number of total pedestrian crossings at the Control site (College Avenue) from 2012 (4,385) to 2013 (4,485) ( $p=0.90$ ). Legal crossings increased at the Control site, but only by 2% (2,341 [53%] in 2012 to 2,507 [55%] in 2013) ( $p=0.01$ ). Similar to the Intervention site, pedestrians were most commonly observed (3712 [85%], 2012; 3890 [87%], 2013), followed by bicyclists (640[15%], 2012; 549[12%], 2013). Amongst children, the small number of legal crossings did not significantly change (10 [77%], 2012; 18 [95%], 2013) ( $p=0.135$ ) but for teens changed from 497(39%) to 162(55%) ( $p<0.001$ ), respectively between 2012 and 2013. As with the Intervention site, total traffic volume at the Control site fell from 132,428 in 2012 to 124,635 in 2013 ( $p<0.001$ ). However, motor vehicles that were traveling above the speed limit of 35 mph increased from 64,310 (49%) in 2012 to 73,552 (59%) in 2013 ( $p<0.001$ ).

### Conclusions

The replacement of an unsafe pedestrian bridge with an at-grade, signalized pedestrian crosswalk and landscaped median significantly impacted both pedestrian crossing behaviors and vehicular traffic behaviors. Specifically, the installation of the pedestrian crosswalk yielded reduced proportions of illegal crossings (especially among children), and reduced the percentage of vehicles speeding on the highway through the neighborhood at the Intervention site while the percentage of vehicles speeding at the Control site increased. This study suggests that street crossing infrastructure changes do change behavior, which will help inform future street crossing interventions and may be used to guide policies promoting physical activity in similar communities where high-speed arterials are barriers to parks and active living.

### Implications for Practice and Policy

By demonstrating increased pedestrian safety and traffic calming, this study adds support to the feasibility of advocacy efforts to reverse transportation practices that favor automobiles at the expense of pedestrian accessibility. These successful outcomes could be used to support advocacy efforts seeking to modify the built environment to increase physical activity in underserved neighborhoods.

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### Support / Funding Source

University of Missouri Research Board Grant



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## **Do Walkable Communities Really Work? Health Impacts of Moving into a Walkable Community and Mechanisms for Health Behavior Changes**

*Xuemei Zhu, PhD<sup>1</sup>, Zhipeng Lu, PhD<sup>1</sup>, Chia-Yuan Yu, PhD Candidate<sup>1</sup>, Chanam Lee, PhD<sup>1</sup>, George Mann, BArch<sup>1</sup>*

<sup>1</sup>*Texas A&M University*

**Focus Area:** Practice/Policy

### **Background and Purpose**

Automobile-oriented developments have become more and more dominant in many parts of the world. Such communities often ignore needs of pedestrians, and may compromise residents' physical and social health. There is now a substantial body of evidence that alternative, walkable developments (with mixed land uses, higher density, connected street networks, rich physical activity resources, and pedestrian-friendly designs) are associated with increased physical activities among residents. Limited studies also suggest that walkable communities may promote social health by encouraging outdoor activities, and thereby, facilitating social interactions and increasing neighborhood cohesion. However, most previous studies are cross-sectional in nature and intervention studies are scarce. It is unclear whether moving into walkable communities really increases people's physical and/or social activities, and more importantly, if yes, how such changes take place. This research addresses these knowledge gaps by conducting a pre-post study of residents moving into a walkable community.

### **Description**

Mueller is a LEED-ND certified, mixed-use community in Austin, Texas, designed to house 10,000 residents and 10,000 employees. Developed based on principles of LEED-ND and New Urbanism, Mueller features activity-friendly characteristics such as high density, mixed land uses, well-connected street networks with sidewalks, and rich and diverse natural resources and open spaces (Figure 1). As of May 2013, Mueller has about 40% of its property developed, with about 3,500 employees and about 900 single family households.

This intervention evaluation study examines (1) if residents increased their physical activities and social interactions and cohesion after moving to Mueller, and (2) if yes, how environmental changes influenced such behavior changes. A conceptual framework (Figure 2) was developed for the hypothesized mechanisms of such impacts: (1) the increase in community walkability promotes residents' physical and social activities both directly and indirectly (by improving relevant personal attitudes and social support—the mediators), and (2) the resulting increases in physical activities and social interactions and cohesion mutually reinforce each other.

Focus groups and online surveys were conducted with Mueller residents in 2013 to inquire about their physical and social activities before and after the move, as well as personal, social, and physical environmental factors that may have an impact on these behaviors. Content analysis was used to analyze the focus group data. For survey data, t-tests were used to examine the pre-post move differences; structural equation models (SEM) were used to examine the complex mechanisms for behavior changes. Currently, this ongoing study has completed one focus group (n=13) and collected 154 valid survey responses. By December 2013, more focus groups will be conducted and more survey responses will be collected.

### **Lessons Learned**

A preliminary analysis was conducted for current survey responses (Table 1). Both adults and children had significant increases in their physical activities. For adults, time spent on walking increased by 40 minutes/week, while time spent on traveling in a car decreased by 96 minutes/week ( $p < 0.001$ ); days with



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30+ minutes of physical activity increased by 0.8 per week ( $p < 0.001$ ). For children, days with 60+ minutes of physical activity increased by 0.8 per week ( $p < 0.01$ ); time spent playing outdoors in neighborhood increased by 11 and 13 minutes, on a typical school day and non-school day, respectively ( $p < 0.05$ ). Frequencies of using community resources (e.g., neighborhoods streets, parks, greenways/trails/paths, home/yard/porch spaces) for physical activities increased for both adults (Figure 3) and children (Figure 4). Adults also reported significantly more social interactions ( $p < 0.001$ ) and stronger neighborhood cohesion ( $p < 0.01$ ) after the move (Table 1). There was a significant correlation between changes in physical activities and increases of social interactions.

A preliminary analysis of the first focus group revealed that environmental features such as sidewalks, parks and open spaces, bike routes, diverse destinations, communal facilities (e.g., mailboxes), and front porches and back alleys played important roles in changing residents' behaviors. However, residents also reported concerns about traffic safety.

### **Conclusions and Implications**

Preliminary results showed significant increases in both physical activities and social interactions and cohesion after residents moved to Mueller. For adult residents, time spent on walking in Mueller had a mean of 123 minutes. This is already very close to the public health guideline for the level of physical activities needed for adults to obtain significant health benefits—at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity per week, or a combination.

### **Next Steps**

Before the conference date, follow-up analyses of the full SEM model (with more survey responses) and additional focus groups will further examine mechanisms for these behavior changes and roles of specific design elements. Findings from this research, especially the impacts of specific environmental features, will be checked against principles of LEED-ND and New Urbanism to see if they produced desired impacts on residents' health-related behaviors.

### **Support / Funding Source**

This project is supported by grants from the American Institute of Architects and the Johns Hopkins University Global Center for Childhood Obesity.



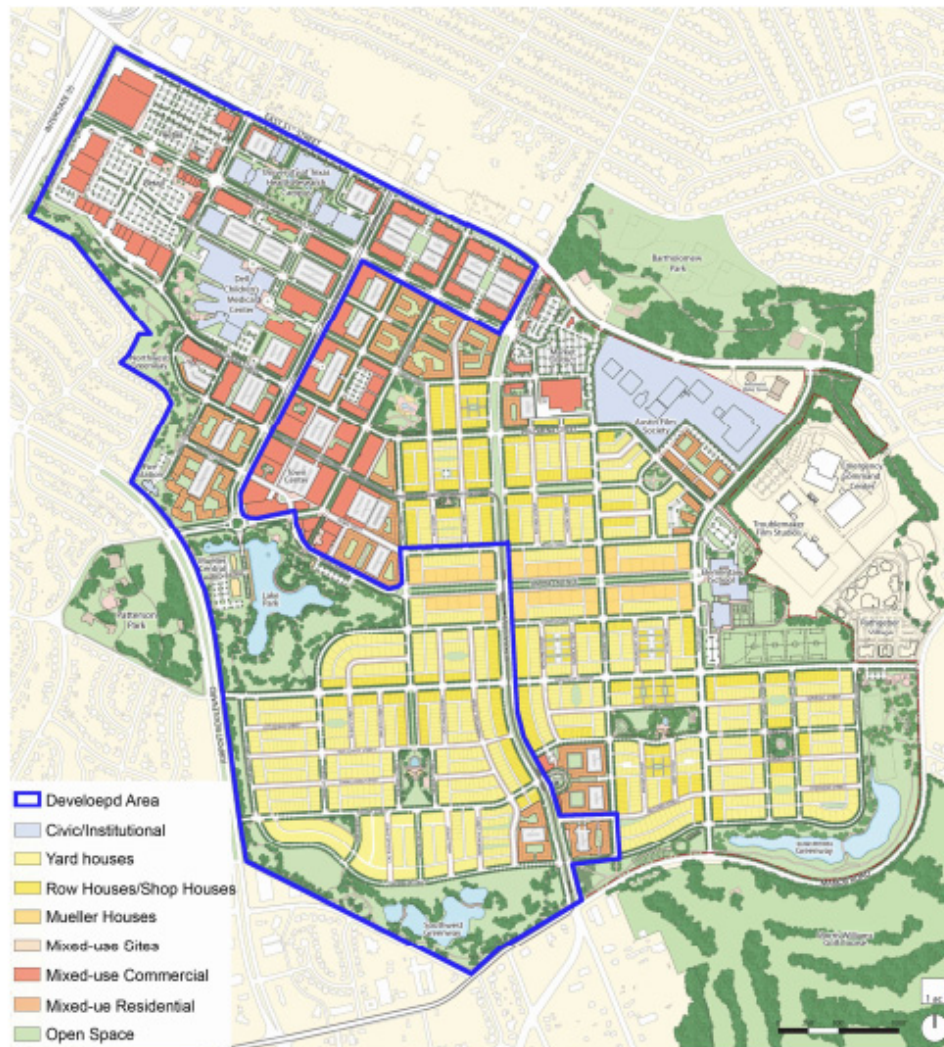


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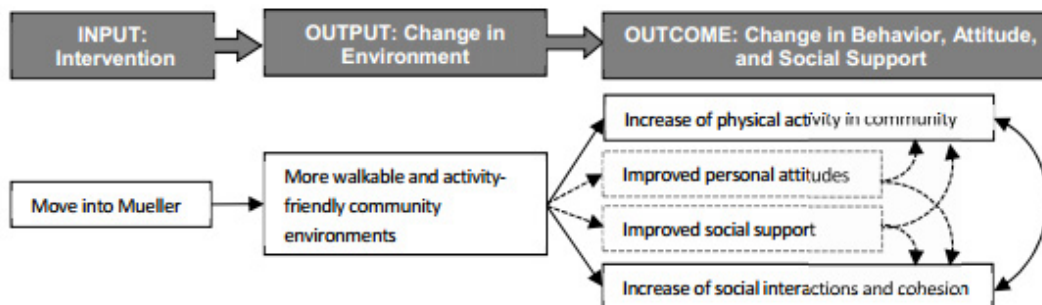
**Table 1: T test results for pre-post move differences**

Outcome variables	Mean difference (post – pre)	
<b>Adult's physical activity (n=154)</b>		
Days with 30+ minutes of physical activity	0.8***	days/week
Days with 30+ minutes of physical activity in neighborhood	1.3***	days/week
Total walking	40.2***	minutes/week
Walking in neighborhood	48.3***	minutes/week
Total bicycling	13.6***	minutes/week
Time spent traveling in a private car	-96.3***	minutes/week
<b>Child's physical activity (n=26)</b>		
Days with 60+ minutes of physical activity	0.8**	days/week
Days with 60+ minutes of physical activity in neighborhood	1.7**	days/week
Time for playing outdoors in neighborhood on a typical school day	11.1*	minutes/day
Time for playing outdoors in neighborhood on a typical non-school day	12.5*	minutes/day
<b>Social interaction (n=154)</b>		
Say hello to a neighbor	9.8***	days/month
Stop and talk with a neighbor	7.2***	days/month
Socialize with a neighbor at your/neighbor's home or somewhere else	2.9***	days/month
Seek help or advice, borrow things from, or exchange favors with a neighbor	2.5***	days/month
<b>Social cohesion (n=154)</b>		
My neighbors could be counted on to help in case of need	2.0**	out of 5
My neighborhood is a close-knit neighborhood	3.3**	out of 5

\*: p<0.05; \*\*: p<0.01; \*\*\*: p<0.001.



**Figure 1. Land use map and developed areas of Mueller Community**



**Figure 2. Conceptual framework for the mechanisms through which environmental changes influence physical activities and social interactions and cohesion**



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## **Examining Local Land Use Policies That May Affect Active Living Among School Students**

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<sup>1</sup>University of Illinois at Chicago, <sup>2</sup>Barker Bi-Coastal Health Consultants

**Focus Area:** Research

### **Background and Purpose**

Policy makers and researchers have been examining ways to solve the youth obesity epidemic. One area of interest has focused on the adoption of local policies related to the built environment to promote physical activity. The Task Force on Community Preventative Services recommends using community and street-scale design and land use policies to promote physical activity.<sup>1</sup> Through its zoning and land development laws, a local government can regulate the location of park and recreation facilities, open space, trails, and other facilities that promote physical activity; regulate land use patterns (e.g. mixed use districts); and specify structural requirements such as sidewalks or bike lanes.

### **Objectives**

This presentation will examine the extent to which youth reside in communities with local land development policies that address infrastructure-related features or improvements that would facilitate active living.

### **Methods**

Data were compiled in 2011 from zoning ordinances and related policies obtained from 378 local governments (county, municipal, town/township) surrounding 154 secondary school catchments where a national sample of secondary school students were enrolled as part of the Bridging the Gap Community Obesity Measures Project (BTG-COMP). Hard and electronic copies of the zoning codes and related policies for each jurisdiction were obtained and were independently reviewed and evaluated by trained policy analysts using the BTG-COMP Built Environment Local Zoning/Policy Audit Tool that seeks to assess the extent to which policies addressed active living. The Tool specifically captures the extent to which policies address any marker that would promote walking and biking (e.g., sidewalks), crosswalks, bike lanes, bike parking, trails/paths, mixed use, bike/pedestrian or street connectivity, active recreation (e.g. playgrounds, athletic fields, recreation facilities, etc.), passive recreation (e.g. open space, parks, etc.), and Complete Streets/Context Sensitive Design (CSD) policies. The Tool also captures the strength and if applicable the type of use (permitted, conditional, accessory) related to each marker.

Each marker was weighted by the proportion of the youth (0-17) population in a given catchment area that resided in each jurisdiction sampled as a proxy for neighborhood school enrollment zones. Youth population estimates were derived from the American Community Survey 2007-2011 5-year file by multiplying each jurisdiction's youth population density by the area in square miles that the jurisdiction overlapped its catchment. The proportion of the catchment youth population in a given jurisdiction was the resulting weight value. These measures were then aggregated to the catchment level. Thus, the weighted policy markers reflect the estimated proportion of the catchment's youth population living in an area that addressed the active living markers of interest (e.g., bike lanes) as well as the strength and type of use variables. The catchment-level variables ranged from 0-1, with 0 meaning that no youth in the catchment were exposed to a given a policy provision and a score of 1 indicating that all of the youth in the catchment were exposed to a given policy. Data for this presentation were based on summary statistics examining the extent to which each of the active living policy markers were addressed and whether they were required and/or permitted uses.



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## **Results**

Most youth lived in catchments with zoning and land use policies that addressed passive recreation (89%), walking or biking infrastructure improvements (88%), active recreation (87%), mixed use (75%), or trails/paths/greenways (70%) (see Figure 1). However, youth were least likely to reside in catchments with zoning and land use policies that addressed bike lanes (30%) or an officially adopted Complete Streets or CSD policy (12%).

Required provisions or permitted use-type provisions also varied as youth were more likely to reside in catchments with policies containing provisions that required or allowed walking/biking-related infrastructure improvements (78%), passive recreation (85%), or active recreation (83%), and were less likely to require or allow policies related to crosswalks (18%), bike lanes (8%), or Complete Streets or CSD (7%).

## **Conclusions**

Although many local governments include active-living oriented provisions in their land use policies, data from this study suggests that some provisions are more prevalent than others. Policies were more likely to address items related to walking and biking, mixed use, and active and passive recreation than they were to address bike lanes or to contain Complete Streets or CSD provisions.

## **Implications for Practice and Policy**

Local governments should review their existing land use policies and modify them to address infrastructure improvements or regulate land use patterns that could be to facilitate active living. Local governments should specifically require structural improvements, such as sidewalks or open space, to ensure active living opportunities.

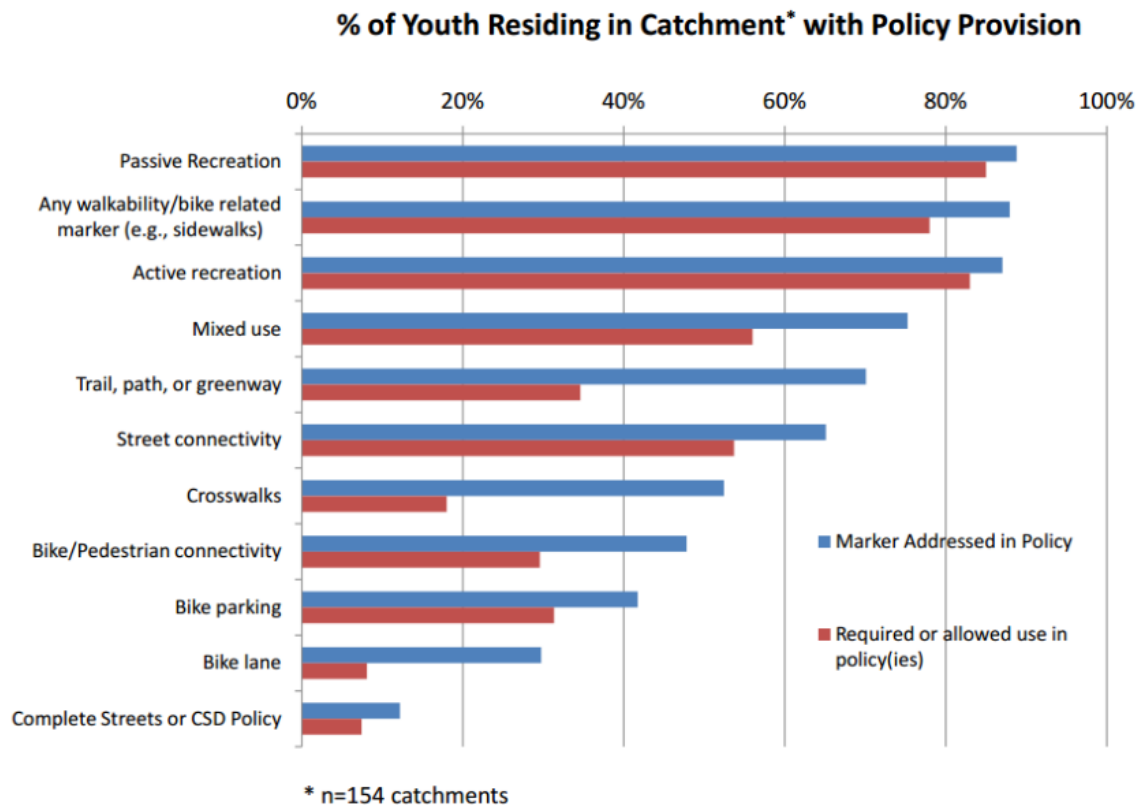
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## **Support / Funding Source**

Robert Wood Johnson Foundation Bridging the Gap Research Program

**FIGURE 1: Prevalence of Policies that Promote Walking/Biking or Recreation**







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### **A Latent Profile Analysis of Childrens' Neighborhoods in Relation to Physical Activity Outside of School**

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**Focus Area:** Research

#### **Background and Purpose**

Neighborhood environment characteristics are consistently related to adult's physical activity; specifically, more active residents live in neighborhoods with built environments that encourage physical activity<sup>1</sup>. Characterizing neighborhoods is complex, involving various neighborhood aspects of walkability, recreation, transit, aesthetics, and safety and their numerous combinations. Latent profile analysis (LPA), a relatively new analytical technique, has shown promise in identifying combinations or patterns of environmental aspects related to objectively measured moderate-to-vigorous physical activity (MVPA) in both adults and children<sup>2,3,4</sup>. Children attain most of their daily physical activity outside of school, thus it is important to understand how the out-of-school environment relates to this activity. However, researchers have yet to examine how patterns in perceived neighborhood environment characteristics relate to children's out-of-school MVPA (MVPA-OS).

#### **Objectives**

This analysis (a) explored latent profile structures underlying parents' perceptions of neighborhood characteristics in San Diego County (CA) and King County (Seattle, WA) and (b) examined differences in children's MVPA-OS across empirically derived neighborhood profiles.

#### **Methods**

The baseline wave of the Neighborhood Impact on Kids Study<sup>5</sup>, provided parents' self-reported neighborhood characteristics and children's accelerometer-based MVPA data. Households in San Diego County (CA) and King County (Seattle, WA) with children aged 6-11 years old were randomly sampled from block groups (neighborhoods) selected to represent supportive and unsupportive physical activity and nutrition environments (for details see Frank et al. (2012)<sup>6</sup>). Parents (n=730) completed the Neighborhood Environment Walkability Scale (NEWS) and items about household, parent, and child demographics. The final sample included 329 children (9.2±1.6 yrs, 49.5% girls, 17.6% nonwhite) from the San Diego region and 373 children (8.9±1.5, 50.1% girls, 16.6% nonwhite) from the Seattle region. We used LPA, a novel technique that maximizes between-group variance and minimizes within-group variance across sets of continuous indicators based on model fit criteria<sup>7</sup>. Types of neighborhoods were identified from patterns of z-scored estimated means of indicators of perceived residential density, land-use mix diversity, land-use mix access, street connectivity, pedestrian facilities, aesthetics, traffic safety, crime safety, transit access, and parks and recreation facility access. MVPA-OS, measured by ActiGraph (GT1M) accelerometer, was obtained by subtracting children's unique school-time MVPA, identified by place and time logs, from total daily MVPA. MVPA and MVPA-OS data were scored using Evenson cut points<sup>8</sup> based on valid wear (=10 hours) days. We used random effects regression models to examine differences in mean daily MVPA and MVPA-OS across latent profiles, adjusting for demographics (child gender, race/ethnicity, and age; parent marital status, income and education) number of cars per legal driver in household, time lived at current address and nesting (non-independence) within block groups.





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### Results

Model fit criteria (i.e., AIC and BIC) for the LPAs supported a 4-profile solution for San Diego (n=329) and a 3-profile solution for Seattle (n=373). Profiles were similar across regions except for the Low Walkable/Safe profile (SD-LWS; n=46, 14.0% of sample) present in San Diego (Figure 1) but not in Seattle (Figure 2). In San Diego, the profiles included: Low Walkable/Unsafe/Recreationally Sparse (SD-LWURS; n=77, 23.4%), Moderately Walkable (SD-MW; n=143, 43.5%), and Overall Activity Friendly (SD-OAF; n=63, 19.1%). In Seattle, the profiles included: Low Walkable/Transit & Recreationally Sparse (S-LWTRS; n=88, 23.6%), Moderately Walkable (S-MW; n=137, 36.7%), and Overall Activity Friendly (S-OAF; n=148, 39.7%). ANCOVA models revealed significantly lower (mean min/day, 95% CI) San Diego child MVPA-OS in the SD-LWURS profile (58.9, 47.2-73.5) compared to the SD-LWS (75.1, 60.1-93.9), SD-MW (71.8, 59.0-87.5), and SD-OAF (73.9, 60.0-91.1) profiles after adjusting for potential confounders. The differences between Seattle profiles were not significant.

### Conclusions

Derived neighborhood profiles in San Diego and Seattle regions based on parents' perceptions of neighborhood characteristics were generally similar, but the unequal number of profiles and differences in some patterns suggests unique aspects in the perceived environment between these regions. Differences in the San Diego region suggested children living in Low Walkable/Unsafe/Recreation Sparse neighborhoods obtained less MVPA-OS than other neighborhoods, while Seattle-area children's out-of-school physical activity did not differ based on profile membership. Parent-perceived neighborhood characteristics may play a key role in children's out-of-school physical activity and identifying patterns of neighborhood characteristics that promote or hinder child physical activity is important for improving neighborhood design.

### Implications for Practice and Policy

These results suggest that patterns of neighborhood characteristics play a role in child physical activity outside of the school setting, and the patterns may be region-specific. Out-of-school physical activity needs to be addressed through providing opportunities in neighborhoods that are supportive of all children's physical activity.

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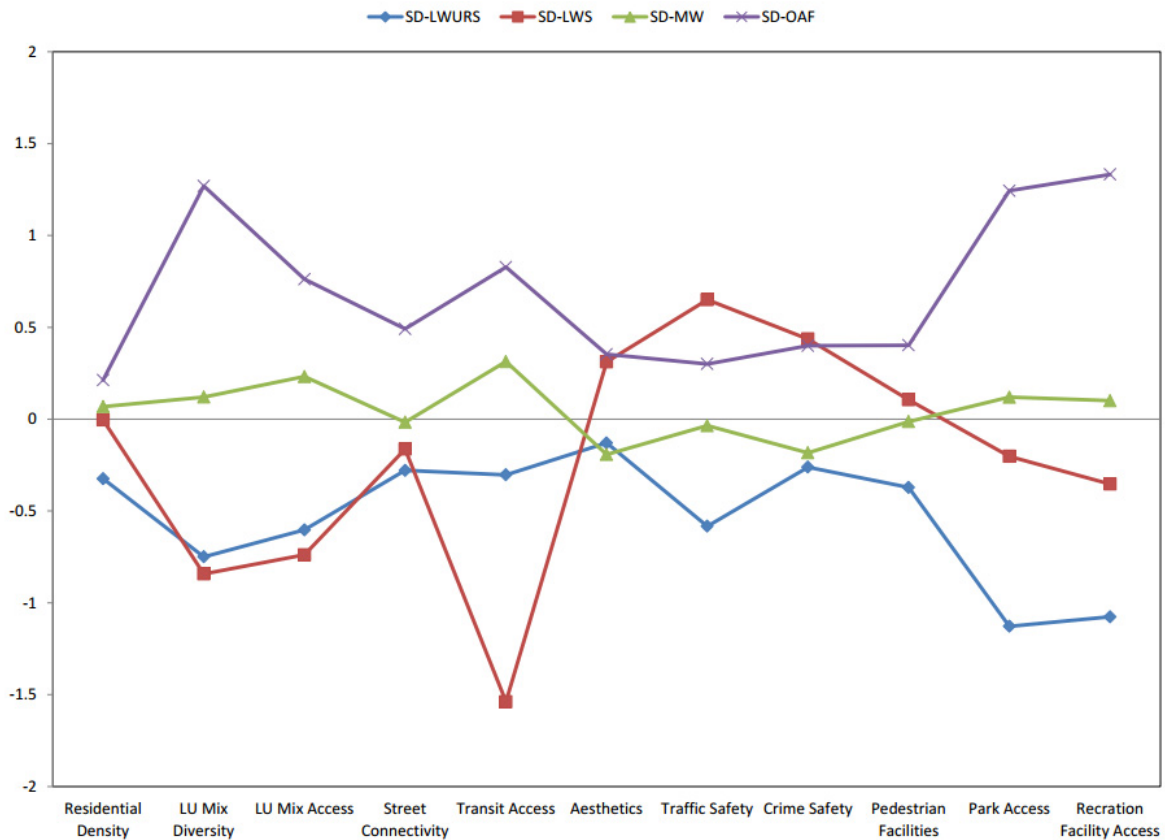


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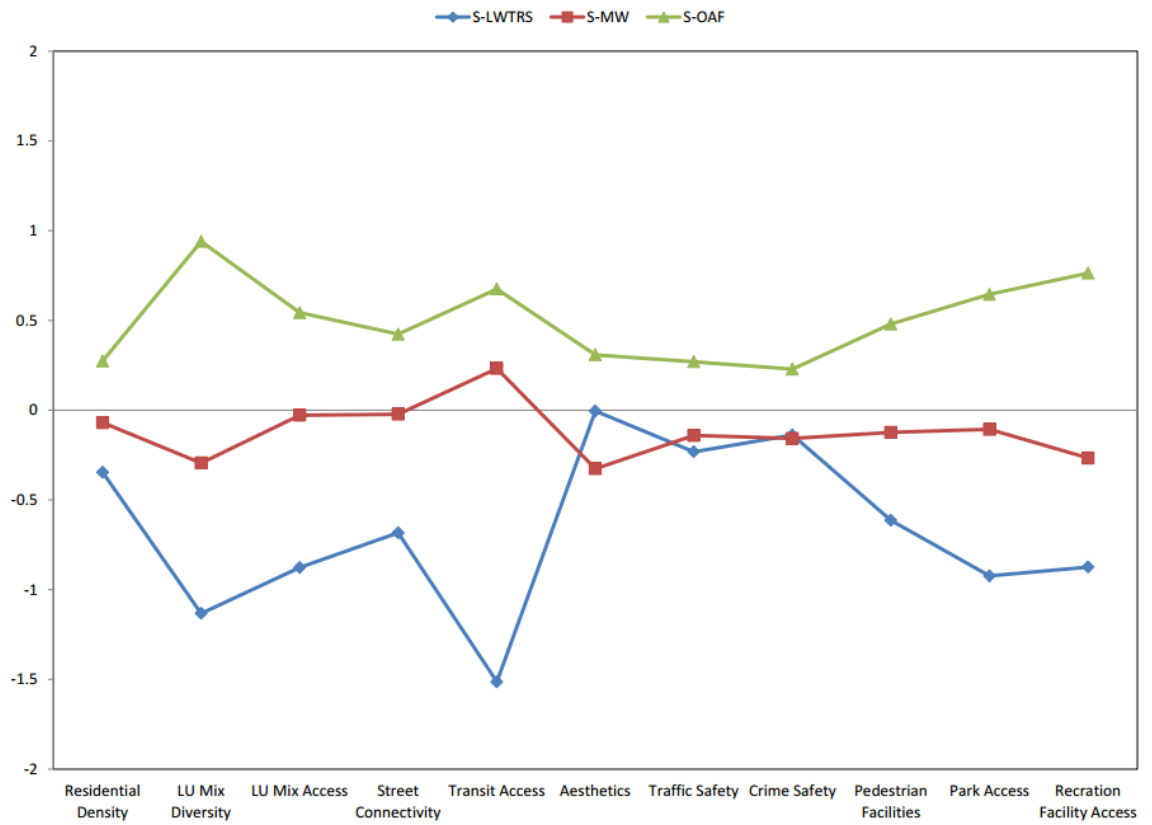
### Support / Funding Source

This work was supported by in part by the American Heart Association’s Beginning Grant in Aid (#12BGIA9280017), the NIH National Institute of Environmental Health Sciences (ES014240), USDA 2007-55215-17924, and by grants to the Seattle Children’s Pediatrics.





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## **A Multi-level Analysis Showing Associations between School Neighborhood and Child Body Mass Index**

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**Focus Area:** Research

### **Background and Purpose**

Environmental effects on child health, including obesity, are well established.<sup>1-13</sup> Studies examining associations between schools and child health largely have focused on the immediate school environment (e.g., cafeteria, schoolyard).<sup>14-16</sup> Accordingly, Harrison and Jones,<sup>17</sup> call for conceptualizing school environments more broadly. In particular, they propose a multi-tiered model that includes the infrastructure of schools themselves, but also surrounding neighborhoods, since even children not residing in those areas nonetheless regularly traverse them. Most importantly, if the areas surrounding schools have significant influence on student health, they may represent anchors around which to more efficiently deploy resources for environmental improvements.<sup>18-23</sup> Additionally, inconclusive findings from previous studies, most examining food environments, warrant additional study of school neighborhoods.<sup>24-29</sup>

With a large sample (n=12,118) of racial/ethnically diverse elementary school children, this study used hierarchical linear modeling to estimate the associations between objective assessments of low-income urban school neighborhoods and measured BMI expressed as BMI percentile. Of critical importance, this study accounted for individual-level factors such as race, gender, and age, to more robustly estimate the effects of park or fast-food density, population change, and other community-level health indicators.<sup>1,13</sup>

### **Objectives**

To examine associations between environmental aspects of neighborhoods surrounding schools and childhood body mass index percentile (BMIp) using a sophisticated hierarchical design to improve the validity of the results.

### **Methods**

Health data were collected from elementary students as part of a non-profit program offering health screenings, education, and referrals. Data at the community/neighborhood level was collected from various databases including the U.S. Census and the Walkscore website. The student data used in this analysis was collected in the 2008-2009 academic year and contained 46 different schools falling in 25 unique zip codes. The distribution across grade levels was relatively even, ranging from 2,123 students in the kindergarten cohort (17.5%) to 1,894 in the fifth grade cohort (15.6%). The schools were heavily minority (41.76% black, 33.28% Hispanic, 21.89% white, and 3.07% other), with 49.07% female and 50.93% male.

Our data have a two-level hierarchical structure where individuals are nested within school/neighborhood. Specifying the model in this way is important because ignoring the clustering effect can lead to false positives in hypothesis testing, something that calls into question some previous work in this area.<sup>30,31</sup> We used HLM, which takes into consideration the intraclass correlation between individuals within the same cluster and adjusts for its effect accordingly. Therefore, it produces more appropriate significance tests while simultaneously examining the effects of variables at both individual and group levels.<sup>31</sup>



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### Results

While race, age, and sex remained predictive, the presence of parks and fitness facilities were associated with additional reductions in BMI percentile. Similarly, the number of fast food restaurants predicts higher BMI percentile, as do declining populations, which likely signal urban decay of some sort. More complex relationships manifest among some other community-level variables in the models. While many call for increased access to grocery stores, particularly in efforts to assist “food deserts,” our analysis shows that access does not necessarily promote health, at least among children. That is, the positive relationship between grocery stores and BMI percentile among children illustrates the need for changing not only access to them, but also likely the types of foods they offer and ultimately the food choices of the consumers who use them. The latter would presumably focus on parents. Similarly, convenience stores often are regarded as having a preponderance of unhealthy food choices. That they manifest in our analysis as health promoting likely has less to do with the convenience stores themselves, and more to do with the density of retail and shopping in areas, which have been show to promote physical activity (mainly walking) resources. This is additionally evidenced by the effect of population size itself, where higher population densities may correspond to greater numbers of destinations within neighborhoods.

Differential estimates of BMI percentile among children based on the results of Model 2 are particularly illuminating. Using the values from our data, the predicted BMI percentile at age 10 by race/ethnicity and sex shows a 15- point drop in BMI percentile for “obesogenic” vs. “non-obesogenic” neighborhoods.

### Conclusions

This paper demonstrates that aspects of the environment in the neighborhoods surrounding schools indeed are associated with childhood BMI percentile, pointing to the fact that they should be regarded as significant zones of health influence for children.

### Implications for Practice and Policy

Where redevelopment efforts have previously focused on classically defined neighborhood boundaries, our study suggests that neighborhood redevelopment efforts by HUD and other non-profits (e.g. Local Initiative Support Corporation) should consider targeting the radial areas around schools, rather than traditionally defined neighborhoods. This is particularly important because improved child health manifests healthier adults later on. While traditional neighborhood boundaries will capture a cross-section of the public, the number of children affected by improvements to school neighborhoods ultimately may pay greater health dividends, and the full range of corollary benefits, as they age.

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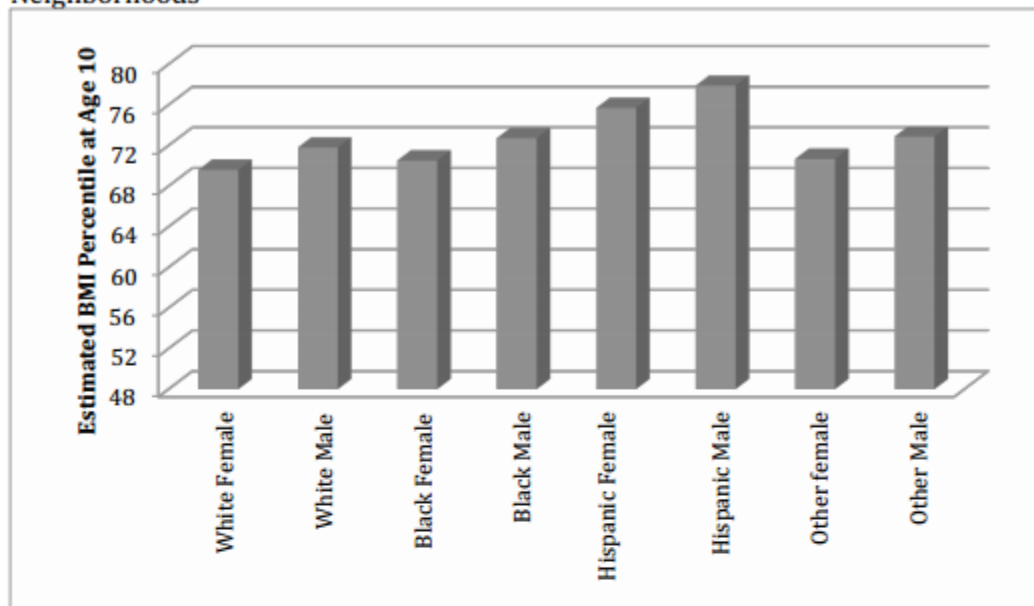
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**Table 1: Descriptive Statistics for Dependent and Independent Variables**

	Mean/Percentage	SD	Min.	Max.	n	missing
<i>Dependent Variables</i>						
BMI Percentile	69.44	26.85	0.01	99.92	12090	28
Overweight	20.69%				12090	28
At Risk of Overweight	38.97%				12090	28
						12118
<i>Individual-level predictors</i>						
Age	98.63	21.28	52	165	12116	2
Female	49.07%				12116	2
White	21.89%				11750	368
Black	41.76%				11750	368
Hispanic	33.28%				11750	368
Other	3.07%				11750	368
Currently on Medication	6.94%				12118	0
						12118
<i>School/Community-level predictors</i>						
School_SES	2.61	0.62	1	3	24	0
Public School	87.91%				24	0
Population Size Zip Code Area/1000	20.11	8.05	2.68	34.22	24	0
Percent White	50.87	20.35	2.8	95.8	24	0
Percent Population Change	-3.32	7.91	-12.8	32.89	24	0
Health sales	4.95	4.33	0	18.2	24	0
Convenient Stores in 0.5 Mile	1.09	1.24	0	4	24	0
Fast Food Store in 0.5 Mile	1.24	1.94	0	7	24	0
Grocery Store in 0.5 Mile	1.2	1.56	0	6	24	0
Fitness Center in 0.5 Mile	0.28	0.63	0	2	24	0
Parks in 1 Mile	2.06	1.82	0	5	24	0
Kansas	28.94%				12118	0

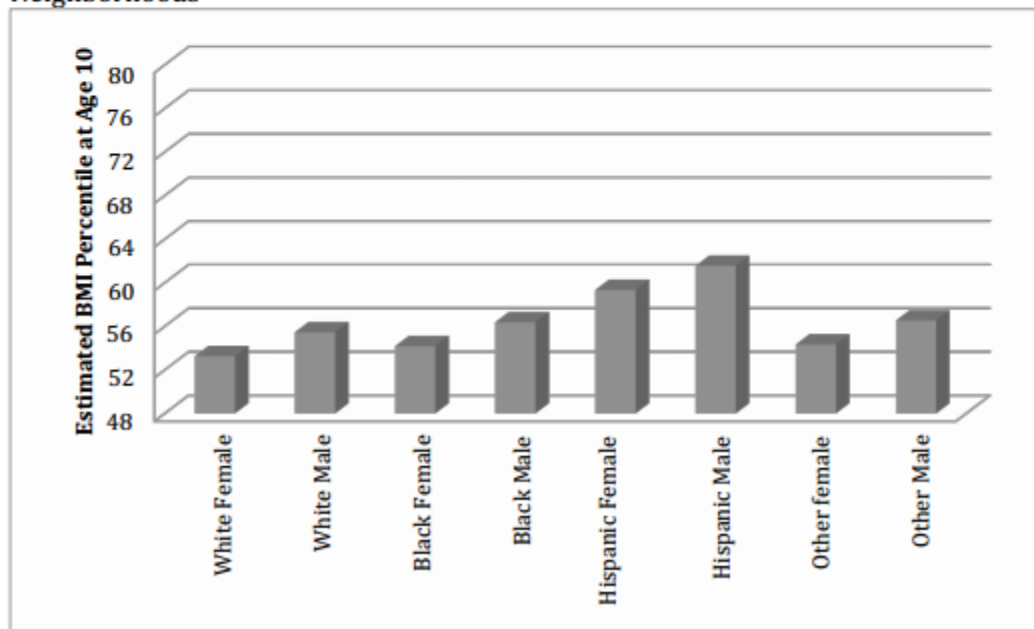


Figure 1: Predicted BMI Percentiles by race and gender in Obesogenic Neighborhoods\*



\*Obesogenic neighborhoods based on the model in this study have no park, no convenient stores, and no fitness centers, but the maximum number of fast food restaurants and grocery stores.

Figure 2: Predicted BMI Percentiles by race and gender in Non-obesogenic Neighborhoods\*



\*Non-obesogenic neighborhoods based on the model in this study have no fast food restaurants, no grocery store, but the maximum number of health sales, convenient stores, parks, and fitness centers.



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## Newly Implemented Comprehensive School Physical Activity Programs and Children's Physical Activity

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**Focus Area:** Research

### Background and Purpose

A whole-of-school approach, such as Comprehensive School Physical Activity Program (CSPAP), continues to be endorsed as a promising way to increase the daily physical activity (PA) levels of children via five integral components: (a) physical education, (b) PA during school, (c) PA before/after school, (d) staff involvement and (e) family/community engagement. In 2012, the National Association for Sport and Physical Education [NASPE] created a professional development (PD) program to equip current teachers with the knowledge, skills and confidence to spearhead the implementation of at least one new school PA program beyond the CSPAP component of physical education. Understanding the PA influence of having a trained PA champion in schools with the greatest risk of obesity can provide timely evidence for the effectiveness and utility of similar training efforts nationwide.

### Objectives

The purpose of this quasi-experimental, cluster non-randomized controlled study was to evaluate the impact of the CSPAP PD program on changes in the school PA levels of underserved 9-14 year-old children for one academic year post training.

### Methods

A stratified sample of 16 certified full-time elementary (n = 9) and middle school (n = 7) teachers of high poverty (72% free and reduced lunch) and minority (81% African American) students were allocated to either a full treatment (n = 7, CSPAP trained in summer 2012 plus customized PD assistance), partial treatment (n = 4, CSPAP trained in summer 2012 only), or waitlist control (n = 5, CSPAP trained in summer 2013) group based on teaching experience and gender. Teachers recruited a random sample of students (M = 25) from their entire rosters of 9-14 year olds resulting in a total of 351 participating children (130 full treatment, 108 partial treatment, 113 waitlist control) who wore accelerometers for 2-5 consecutive school days during fall 2012 (baseline) and spring 2013 (post). Teachers and students completed weekly logs describing the types and timing of PA opportunities during each data collection period. The primary PA outcomes that served as the dependent variables were: (a) percentage of time spent in PA, (b) percentage of time spent in moderate-to-vigorous PA (MVPA), and (c) percentage of time spent in sedentary behavior over the five day period. The independent variables were the conditions of waitlist control, partial treatment, and full treatment.

### Results

Of the 351 sampled children, 298 had full baseline/post data sets on all study variables. ANOVA revealed no significant differences between the partial and full treatment groups with regard to portion of time spent in PA (p = .76), MVPA (p = .63), and sedentary behavior (p = .63). Accordingly, the treatment conditions of full and partial were collapsed for the remaining analyses. ANOVA results revealed that all post PA mean values (e.g., Mcontrol = 20.00%, SD = 0.09; Mtreatment = 21.06%, SD = 0.05) were significantly lower than the pre PA mean values (e.g., Mcontrol = 26.32%, SD = 0.02; Mtreatment = 23.46%, SD = 0.05, p < .001). However, MANOVAs revealed [F(1, 297) = 28.95; p < .001; R2adjusted = .09] that the



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total proportion of children's PA time in schools with a partially or fully CSPAP trained teacher was significantly higher than children with a non-CSPAP trained teacher. This finding was also true for the proportion of time spent in MVPA,  $F(1, 297) = 23.96$ ,  $p < .001$ ;  $R^2_{adjusted} = .08$ . The portion of time dedicated to sedentary behavior significantly decreased in children housed in schools with either a full or partial treatment teacher compared to control teachers,  $F(1, 297) = 28.00$ ,  $p < .001$ ,  $R^2_{adjusted} = .09$ .

### **Conclusions**

Although all participating students significantly declined in the total amount of PA and MVPA over the school year, perhaps because of weather or mandated testing schedules, students taught by full or partial treatment teachers participated in significantly more PA and MVPA and significantly less sedentary behavior than the students taught by control teachers as a result of the increased number of PA opportunities offered by the CSPAP PD. These findings are encouraging, but effect sizes were small. We believe follow-up data may reveal differences between students in schools with a partial and full treatment teacher as some of the full effects of teacher's effort may not be observed until year 2 and 3 of CSPAP implementation.

### **Implications for Practice and Policy**

This study provides preliminary evidence for the effectiveness of PD programs on improving school PA. We hope this work provides further evidence to advance the development and impact of national training efforts underway surrounding school PA champions (e.g., Physical Activity Leader). Consequently, it is our expectation that this research will inform policy decisions related to CSPAP implementation and its implications for evidence-based PD and increased student PA levels in schools.

### **Support / Funding Source**

This research was funded by the Robert Wood Johnson Foundation, Active Living Research Building Evidence to Prevent Childhood Obesity Rapid Response Grant, Round 3.



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### **The Impact of Playworks on Play, Physical Activity, and Recess: Findings from a Randomized Controlled Trial**

*Martha Bleeker, PhD, MS<sup>1</sup>, Susanne James-Burdumy, PhD<sup>1</sup>, Nicholas Beyler, PhD, MS<sup>1</sup>, Jane Fortson, PhD<sup>1</sup>*

<sup>1</sup>*Mathematica Policy Research*

**Focus Area:** Research

#### **Background and Purpose**

Recess has been reduced or eliminated in many schools across the U.S. and these declines have disproportionately affected low-income minority students in urban areas (Barros, Silver and Stein 2009). These findings are problematic, since research suggests that physical activity and structured play during recess may improve academic and behavioral outcomes in youth (CDC 2010). Playworks is a school-based program that places full-time coaches in low-income schools with high-minority populations to provide opportunities for organized play during recess. This current study evaluates the impact of Playworks on play, physical activity, and recess activities.

#### **Objectives**

In this presentation, we will present findings from a randomized controlled trial of Playworks. We will focus on outcomes that measure the impact of Playworks on play, physical activity, and recess collected from multiple data sources, including student surveys, teacher surveys, structured recess observations, and accelerometers. We will discuss the implications of the significant (and non-significant) impacts on increasing physical activity levels in minority youth populations.

#### **Methods**

Twenty-nine schools (17 treatment schools, 12 control schools) from six cities across the U.S. were recruited for a rigorous, random assignment evaluation of the Playworks program. Schools were grouped into blocks based on time-invariant, school-level characteristics and then randomly assigned to either the treatment condition (implementation of Playworks during the school year, either 2010-11 or 2011-12) or a control condition (delayed implementation of Playworks until after the study). Data were collected in spring 2011 and 2012 to document the implementation and impact of Playworks on key outcomes related to play, physical activity, and recess. A brief description of the data sources and sample sizes are as follows:

1. **Student Survey.** A total of 2,331 students from 119 4th- and 5th-grade classrooms participated. Items assessed physical activity during recess, recess activities, interactions at recess, and perceptions of recess.
2. **Teacher Survey.** A total of 296 teachers participated. Items assessed student physical activity during recess, student interactions at recess, and perceptions of student feelings about recess.
3. **Accelerometers.** A total of 1,579 students from 98 4th- and 5th-grade classrooms wore Actigraph GT3X accelerometers for 10 or more minutes during recess on one or two school days. The accelerometers recorded intensity counts and the number of steps taken. Accelerometer intensity counts were also used to construct outcomes measuring the time students spent in sedentary, light, moderate, and vigorous activity during recess.
4. **Structured Recess Observations.** Six observations were conducted at each school, using the System for Observing Play and Leisure Activity (SOPLAY). Observations were conducted in designated zones of the play area and captured information on recess equipment, student physical activity levels, and types of activities.



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### **Results**

Accelerometer data showed that Playworks had a positive impact on students' physical activity during recess. Students in treatment schools engaged in physical activity during recess that was, on average, more intense than the physical activity engaged in by control group students. Students in treatment schools also spent significantly more time engaged in vigorous physical activity during recess than students in control schools.

Based on recess observations, a higher percentage of recess activities at control schools were classified as sedentary compared to treatment schools. However, the recess observations did not find a significant difference between treatment and control schools in terms of the percentage of students that were engaging in moderate or vigorous physical activity.

Playworks had a positive impact on some of the teacher survey outcomes. Teachers in treatment schools were more likely to report better student behavior at recess and a smoother transition back to class than teachers in control schools. A higher percentage of teachers in treatment schools, compared with control schools, also agreed or strongly agreed that their students enjoyed adult-organized activities at recess and felt ownership over their activities during recess.

### **Conclusions**

We found some evidence that Playworks has a positive impact on play, physical activity, and recess. However, we also found no significant differences between treatment and control schools based on some outcome measures.

### **Implications for Practice and Policy**

Educators, especially those in schools and districts located in low-income, high minority areas, should consider the benefits of recess and, more specifically, the benefits of Playworks in increasing students' physical activity.

### **References**

1. Barros RM, Silver EJ and Stein RE. "School Recess and Group Classroom Behavior." *Pediatrics*, 123(2): 431—436, 2009.
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### **Support / Funding Source**

This project was funded by a grant from the Robert Wood Johnson Foundation.



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## **Time to Play: Increasing Physical Activity through a Mandatory Daily Active Recess Policy in New York**

*Rachel Manes, MS, MPhil<sup>1</sup>, Monica Chierici, MPA<sup>1</sup>, Rachel Pickering, BS<sup>2</sup>*

*<sup>1</sup>New York Academy of Medicine, <sup>2</sup>The Children's Agenda*

**Focus Area:** Practice/Policy

### **Background and Purpose**

The American Academy of Pediatrics and U.S. Department of Health and Human Services Physical Activity Guidelines encourage 60 minutes of daily physical activity for elementary school children. This amount of daily physical activity helps reduce the risk of obesity, promotes academic performance and mental ability, and also provides social benefits. Yet, many children across the United States and New York State, in particular, are not taking part in the recommended 60 minutes of daily physical activity. To help meet this recommendation, the DASH-NY Obesity Prevention Coalition produced a Mandatory Daily Active Recess Policy Implementation Guide as an informational resource for parents, teachers, school officials, and physical activity advocates interested in increasing physical activity among students in K-5. A mandatory daily active recess policy presents the opportunity to provide daily physical activity for up to 20 minutes and establishes recess as a time for students to engage in physically active free play or structured games. The policy guide can help physical activity advocates build interest and educate stakeholders on the benefits of recess as well as assist in each step of planning and implementing a daily active recess policy at elementary schools.

### **Description**

This presentation describes how a mandatory daily active recess policy can help reduce disparities among racially and ethnically diverse populations of children and those living in lower-income communities at greatest risk for obesity. Schools with more than a 50 percent minority enrollment or in the lowest income levels on average participate in the fewest minutes of recess (RWJF, 2007). However, implementing a policy like mandatory daily active recess ensures that all students will have the opportunity to reap the benefits of daily physical activity. A survey of 40 elementary schools across Rochester, NY indicated that schools with mostly low income students of color were less likely to have a policy around daily recess than suburban schools resulting in decreased recess participation for children living in Rochester (Healthi Kids, 2010). Creating partnerships with organizations from outside the school district helped to educate and convene stakeholders around support for a mandatory daily active recess policy in the City of Rochester. As a result, the Rochester Public School District amended their school district's wellness policy to include such a policy which went effect during the 2012-2013 school year.

### **Lessons Learned**

Piloting the policy in two schools before implementing it district-wide for 34,000 children allowed the district to address barriers to implementation on a smaller scale. Before policy implementation, schools had greater difficulty ensuring that recess facilitated active play and structured games when it was held indoors because of bad weather than when it was held outdoors. Therefore, elementary schools were advised to create an additional building-level policy that detailing how mandatory daily active recess will be achieved in a variety of contingency situations. Creative solutions were put in place and utilized by Rochester schools in the event that outdoor recess had to be cancelled – ranging from 10 minutes of indoor physical activity at the beginning of the day to having classroom teachers incorporate movement into classroom lessons. After policy implementation, school staff needed guidance on how to supervise recess, with a particular focus on conflict resolution. This barrier was addressed through trainings for school staff and by providing curriculum resources. Playworks, a national organization that promotes recess supervision, is one such group that can also lend support by providing coaches who resolve conflicts that arise on the playground and encourage cooperative free play.





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### **Conclusions and Implications**

Mandatory daily active recess is a relatively easy, low cost solution to meeting physical activity guidelines for children and can account for as much as one third of their recommended daily physical activity (RWJF, 2007). Implementing a mandatory daily active recess policy is an ongoing effort that engages many stakeholders throughout the process. These advocates range from school officials and parent-teacher organizations to community organizations and even representatives of the local government who form partnerships in support of this policy. Ultimately, the implementation of mandatory daily active recess is a collaborative process that will continue to engage many stakeholders from both within and outside of schools across the state of New York.

### **Next Steps**

Further research should identify activities that best support policy implementation and evaluate the extent to which this policy leads to improved health outcomes for elementary school children. Longitudinal research can determine if a mandatory daily active recess policy leads to improved health outcomes during adolescence.

### **References**

1. Robert Wood Johnson Foundation. 2007. Recess Rules. Princeton, NJ.
2. Healthi Kids. 2010. Recess Report 2010. Rochester, NY: Finger Lakes Health Systems Agency.
3. DASH-NY. 2013. Time to Play: Improving Health and Academics through Recess in New York Elementary Schools. A Mandatory Daily Active Recess Policy Implementation Guide. New York, NY: New York Academy of Medicine.

### **Support / Funding Source**

With funding from the New York State Department of Health, DASH-NY serves as New York State's Obesity Prevention Policy Center.



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## **Spatial profiling: a latent profile analysis of obesogenic environments**

*Malia Jones, MPH, PhD<sup>1</sup>, Jimi Huh, PhD<sup>2</sup>, Donna Spruijt-Metz, MFA, PhD<sup>2</sup>, Genevieve Dunton, MPH, PhD<sup>2</sup>, Mary Ann Pentz, PhD<sup>2</sup>*

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**Focus Area:** Research

### **Background and Purpose**

In spite of progress on the issue, obesity remains among the most challenging health issues of our time. Features of the built environment can contribute to obesity by increasing the real or opportunity costs of healthy food choices and physical activity. The term “obesogenic environment” describes geographic areas that promote obesity across multiple domains—too much fast food, not enough fresh food, and not enough support for physical activity (1). However, the effect of obesogenic environments on the actual weight status of those exposed to them has not been conclusively established. Most research has focused on either single objective built environment indicators, subjective ratings of walkability, and/or conventional residential buffers to characterize neighborhood-level risk. In this study, we used multiple objective GIS measures to generate latent profiles of neighborhood risk, with neighborhood defined activity spaces rather than residences.

### **Objectives OR Description**

Using a sample of 460 adults in Southern California, we sought to discover a typology of obesogenic risk in the built environment, and determine whether these categories of places predicted physical activity and weight status.

### **Methods**

We used Wave 1 data from 460 adult respondents in two control groups from Healthy PLACES, a natural experiment which has the overarching goal of examining the effects of “smart growth” community design principles on obesity outcomes. Study participants had at least one school-aged child who also participated in the study. We used 7 measures of the built environment derived from a GIS: vegetation index, residential/commercial land use mix, fast food restaurants, parks, street connectivity, and traffic accidents involving pedestrians or cyclists. To define neighborhood of likely exposure, we created stadium-shaped 1-mile buffers around the line connecting adults’ homes and the school at which their child is enrolled. Since most adults spend a large amount of their time outside the immediate vicinity of home, but within a few miles of it (2), we took these buffers as a proxy for the local geography to which the study participants are likely to be exposed on a regular basis. We also used self-reported data on age, gender, and educational attainment; anthropometric measures; and physical activity collected using an accelerometer over a 7-day study period.

Analysis proceeded in two phases. Our first analytic step was to enter the set of 7 continuous area measures into a latent profile analysis. A latent variable modeling approach can be used to identify unobserved subgroups among a set of continuous characteristics, in this case, characteristics of the built environment that have been linked to obesity.

In the second stage of analysis, we entered the categories of neighborhood identified in the first step as independent variables in a regression model. Our outcomes in separate models were moderate-to-vigorous physical activity (MVPA) measured by accelerometer, body mass index (BMI), and waist circumference. Final models were adjusted for age, gender, and educational level, an indicator of socioeconomic status.



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### Results

Latent profile analysis identified four distinct unobserved environmental profiles. We expected neighborhoods classified as Profile 2 to be the most obesogenic, with low greenness, high proportion commercial land use, and the highest rate of pedestrian and bike accidents. Neighborhoods fitting in Profile 3 seemed the least obesogenic, with high greenness, low proportion commercial, low pedestrian and bike accidents, and moderate street connectivity. Bivariate analysis confirmed that participants in Profile 2 had the highest weight status and lowest MVPA; and those exposed to Profile 3 had the healthiest weight status and highest MVPA. These differences were significant.

Membership in a Profile 3 neighborhood was significantly associated with lower BMI and nearly 20 minutes per day of additional MVPA, compared to membership in a Profile 2 context. However, the results did not remain significant after adjusting for gender, age, and education.

### Conclusions

Our primary aims were to find latent profiles of built environment obesity risk factors, and test whether these profiles were associated with increased risk for obesity. Using LPA, we identified four distinct profiles of neighborhood obesogenic risk. Furthermore, these context types were marginally predictive of obesity and physical activity among the adults who experienced them. Our results suggest that latent profile analysis can uncover latent clusters of risk factors for obesity in the built environment. Our results also suggest that the experience of built environment as a factor in obesity is complex and multidimensional. Further research should focus on the interrelationships between many environmental exposure factors, and the possibility that they interact with one another.

### Implications for Practice and Policy

As we work to change the obesity risk environment, we should consider that environments are multifactorial. Strategic small changes in more than one dimension of the built environment may be able to shift the overall obesogenic profile of an area. Also, we should be mindful of the fact that people do not spend all of their time at home; they experience a range of places and may self-select environments based on their own priorities.

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1. Saelens BE, Sallis JF, Frank LD, Couch SC, Zhou C, Colburn T, et al. Obesogenic neighborhood environments, child and parent obesity: the Neighborhood Impact on Kids study. *Am J Prev Med* 2012;42(5):e57-64.
2. Jones M, Pebley AR. Redefining Neighborhoods Using Common Destinations: Social Characteristics of Activity Spaces and Home Census Tracts Compared. In press, *Demography* 2013.

### Support / Funding Source

This research was supported by the National Cancer Institute (Grant T32CA009492-280).



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## **Contribution of Streetscape Audits to Explanation of Physical Activity in Four Age Groups: Validity of the Microscale Audit of Pedestrian Streetscapes (MAPS)**

*Rachel Millstein, MHS, MS<sup>1</sup>, Kelli Cain, MA<sup>2</sup>, James Sallis, PhD<sup>2</sup>, Terry Conway, PhD<sup>2</sup>, Kavita Gavand, MS<sup>2</sup>, Lawrence Frank, PhD<sup>3</sup>, Brian Saelens, PhD<sup>4</sup>, James Chapman, MS<sup>5</sup>, Marc Adams, PhD<sup>6</sup>, Karen Glanz, PhD<sup>7</sup>, Abby King, PhD<sup>8</sup>*

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**Focus Area:** Research

### **Background and Purpose**

Many built environment factors have been related to physical activity and walking behavior (Bauman et al., 2012), microscale features that affect people's experience of the environment have been less studied. The Microscale Audit of Pedestrian Streetscapes (MAPS) tool was designed to measure features such as street design, transit stops, sidewalk qualities, street crossing amenities, social features and aesthetics.

### **Objectives**

To examine associations of a wide range of microscale environmental attributes, using a reliable instrument and systematic scoring system (Millstein et al., 2013), with multiple physical activity measures, in four age groups. The present study fills additional gaps by studying three regions of the US, presenting findings with and without adjustments for macro-level neighborhood walkability, and assessing individual microscale attributes and cumulative scores. Microscale characteristics were expected to be significantly associated primarily with walking for transportation, and the cumulative scores were expected to be stronger correlates of walking for transport than any individual characteristic.

### **Methods**

Objective microscale environmental data were collected as part of three studies examining the relation of neighborhood design to physical activity, nutrition behaviors, and weight status in children, adolescents, adults, and older adults. These studies were conducted in urban and suburban neighborhoods in Seattle/King County, WA, San Diego, CA, and the Baltimore, MD-Washington, DC regions. Neighborhoods were selected to vary on macro-environment features and median income, so present analyses represented a wide range of neighborhood built environment and sociodemographic characteristics. Participants (n=3677) represented four age groups (children, adolescents, adults and older adults). MAPS audits were conducted along a 0.25 mile route from participant homes toward the nearest non-residential destination (i.e., shops or services, a park, or a school). A comprehensive scoring system (Millstein et al., 2013) was used to construct subscales and overall summary scores for each section of MAPS: route, intersections, segments, and cul-de-sacs. Walking/biking for transportation and leisure/neighborhood physical activity were measured with age-appropriate surveys (ActiveWhere, GPAQ, CHAMPS). Objective physical activity was measured with accelerometers. Mixed linear regression analyses were performed to assess the effect of MAPS scores on multiple physical activity outcomes for each age group, adjusting for all covariates as fixed effects and participant clustering in census block groups as a random effect. All models were run with and without adjusting for macro-level GIS-defined walkability (high/low).

### **Results**

There were many significant associations across all age groups after adjusting for macro-level walkability (51.2%, 22.1% and 15.7% of MAPS scores were significantly associated with walking/biking for transport, leisure/neighborhood physical activity, and objectively-measured MVPA, respectively). Destinations and land use, streetscape, segment, and intersection variables were mainly related to transport walking/biking. Aesthetic variables were related to leisure/neighborhood physical activity. The overall



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summary score was related to total MVPA in children and older adults. Cul-de-sacs were related to neighborhood physical activity in children and adolescents. In general, the strongest associations were seen with the MAPS summary scores.

### Conclusions

The value of using observational measures of streetscapes was demonstrated by many findings that MAPS variables significantly explained physical activity among four age groups, adjusting for macro-level walkability. The pattern of findings suggests that many modifiable built environment attributes are related to physical activity. Environment-physical activity associations were specific to domain, consistent with hypotheses and previous research. The present study provides substantial evidence that microscale features independently explain physical activity, especially active transportation, adjusting for walkability. The importance of these findings is that microscale features like sidewalk quality, street crossing aids, and aesthetic variables are feasible and affordable to change. Given that the strongest associations were with MAPS summary scores, physical activity behavior is more likely to be influenced by the cumulative impact of numerous environmental attributes than by a few critical variables.

### Implications for Practice and Policy

Present findings provide strong evidence that microscale environment attributes are related to physical activity patterns across age groups, and these associations are independent of macro-level walkability. The pattern of findings is consistent with an interpretation that the cumulative effect of numerous attributes is the likely mechanism of effect. Using instruments like MAPS can help identify built environment changes that can be achieved at a reasonable cost and in a feasible time frame with a likelihood of improving physical activity.

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### Support / Funding Source

NIH grants RO1 ES014240, RO1 HL083454, and RO1 HL077141.



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## Measuring Perceived Environments through Ecological Momentary Assessment: Correspondence with Objective GIS Indicators

Eldin Dzubur, MS<sup>1</sup>, Yue Liao, MPH<sup>1</sup>, Mary Ann Pentz, PhD<sup>1</sup>, Genevieve Dunton, PhD, MPH<sup>1</sup>

<sup>1</sup>University of Southern California

**Focus Area:** Research

### Background and Purpose

Perceived neighborhood traffic and greenness are important variables that have been examined in prior research correlating the built environment with health-related behaviors such as walking and exercise. In general, vehicular traffic presents hazards to pedestrians that limit participation in physical activity and has been associated with poorer health in adults and children. Neighborhood greenness improves perceived aesthetics and access to natural shade encouraging individuals to engage in physical activity and subsequently better overall health in the population. Studies typically use retrospective survey methods to measure subjective perceptions of the neighborhood environment (e.g., Neighborhood Environment Walkability Survey [NEWS]). However, this approach may be prone to recall biases, condense perceptions of multiple micro settings into one overall neighborhood rating, and take into account parts of the neighborhood that are never or not regularly encountered. Ecological momentary assessment (EMA) provides an alternate way to measure the perceived environment by collecting real-time assessments of one's immediate setting on mobile devices. However, an important first step to using EMA measures of the perceived environment is to examine the extent to which they correspond to objective measures of the built environment such as Geographic Information System (GIS) indicators

### Objectives

The primary purpose of this study was to assess the convergent construct validity of EMA self-report of perceived traffic and greenness. To address this objective, the study analyzed EMA items measuring adults' perceptions of nearby traffic, greenery, and shade. These items were compared respectively to objective measures of traffic (all vehicular collisions) and greenness (Normalized Difference Vegetation Index) near each participant's place of residence.

### Methods

The study sampled adults from the first two waves of data from an ongoing study investigating the effects of environmental and interpersonal factors on health behavior decision-making. The participants carried mobile devices (HTC Shadow) with a custom EMA application that prompted for surveys eight times a day for a period of four days per wave. Each wave was separated by six months. Participants were asked a random subset of questions from a larger survey in order to limit time spent taking the short assessment. One item rated the perceived level of traffic ("How much TRAFFIC is on the closest street to where you are right now?") and two items rated the perceived level of greenery ("How many TREES AND PLANTS are there in the area where you are right now?" and "How much SHADE FROM THE SUN is there in the area where you are standing right now?"). Using ArcGIS, a 3000 meter street network buffer was created around each subject's place of residence to measure NDVI in 20XX and all collisions after the year 2006. Three multilevel regressions examined the validity of EMA-reported perceived traffic against GIS-derived vehicular collisions, EMA-reported perceived greenness variable against GIS-derived NDVI, and EMA-reported perceived shade variable against GIS-derived NDVI. Time (wave) was treated as a covariate in each equation.

### Results

The final sample consisted of 43 individuals with a total of 165 observations after exclusions. Eighty-one percent of subjects were female and 35% of subjects reported being Hispanic, with ages ranging from 29 to 59. After adjusting for wave, the positive association between EMA-reported perceived greenness and





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NDVI was statistically significant,  $B=11.59$ ,  $p=0.008$ . EMA-reported perceived traffic was positively associated with vehicular collisions after adjusting for wave,  $B=0.02$ ,  $p=0.016$ . The positive association between EMA-reported perceived shade and NDVI was marginally significant after adjusting for wave,  $B=4.13$ ,  $p=0.087$ .

### **Conclusions**

Results from this study provide initial evidence of the construct validity of EMA-reported perceptions of neighborhood traffic and greenness. EMA-reported perceived greenness (i.e., trees or plants) corresponded with an objective measure of greenness (NDVI). Likewise, the EMA-reported variable for perceived traffic was validated against an objective measure of traffic (i.e., vehicular collisions). The findings are consistent with prior research in children validating the EMA-reported variables against parent-reported retrospective traffic and aesthetics on the NEWS. However, there was only partial validation of the EMA-reported variable for shade against objective greenness. One explanation for this could be vagueness of the question. While shade from the sun often refers to trees and other natural shrubbery, there are many situations where shade could come from tents, tall buildings (such as during sunset or sunrise), or other manmade structures (e.g. parking garages). These findings offer support for the construct validity of EMA items measuring perceived greenness and traffic and suggest that the EMA-reported item measuring shade may not be necessary when attempting to measure greenness, although future studies could validate the shade measure against a real-time UV monitor.

### **Implications for Practice and Policy**

By showing construct validity, these findings allow future practice and policy research to utilize EMA measures for perceived greenness and traffic, thereby eliminating major hurdles such as recall bias. New studies will be able to show more conclusive findings on greenness and traffic by correlating perceived micro settings with health behaviors.

### **Support / Funding Source**

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## **Evidence Review: Reporting Guidelines to Enhance Evidence-Based Practice**

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<sup>1</sup>*Transtria LLC*

**Focus Area:** Research

### **Background and Purpose**

Over the past decade, public and private U.S. funders have invested in research and evaluation to understand the most effective, feasible, and sustainable strategies to combat childhood obesity.<sup>1</sup> This evidence is used to aid practitioners and decision-makers at the organizational or agency, community, state, or national levels in selecting strategies to best fit their health, economic, environmental, and social circumstances. Current comprehensive review systems (such as the Community Guide and the Cochrane Review) provide guidance to practitioners and decision-makers interested in implementing change; yet, keeping up with the vast amount of research and evaluation data generated in the field is an ongoing challenge.<sup>2-7</sup> In turn, decision-makers often rely on insufficient evidence as well as reviews focused more on assessing the internal validity of study results without complementary evaluation of the external validity (e.g., reach, implementation fidelity, and sustainability) associated with intervention impacts.<sup>8-10</sup>

### **Objectives**

The aims of the review were to: 1) develop and apply replicable methods – modeled after respected formal systematic evidence review systems (e.g., Community Guide) – to assess the scientific and grey literature addressing policy and environmental strategies for reducing obesity levels, improving healthy eating, and/or increasing physical activity among youth aged 3-18 years of age; 2) summarize these findings using easy-to-read evidence maps that identify effects/associations related to obesity/overweight, physical activity, and nutrition/diet outcomes; and 3) classify intervention strategies, based on their effectiveness and population impact using ratings ranging from “effective” (recommended for use) to “promising” and “emerging” (recommended for further testing).<sup>11,12</sup>

More comprehensive reviews stemming from improved reporting and review standards may provide a better platform for practitioners, decision-makers, evaluators, and researchers to understand the effectiveness and impact of interventions to prevent childhood obesity.

### **Methods**

Investigators created a protocol to systematically identify, abstract, review, and rate evidence from a variety of sources (e.g., intervention evaluations, associational studies). The ratings were designed to reflect effectiveness (study design, intervention duration, effects or associations) and population impact (effectiveness plus potential population reach – participation or exposure and representativeness) of multicomponent and complex interventions, with a particular emphasis on impacts for racial/ethnic and lower-income populations of greatest need for these interventions. Over 2,000 documents, published between January 2000 and May 2009 in the scientific and grey literature, were identified (2008-2009) and systematically analyzed (2009-2012). Studies focused on policy or environmental strategies to reduce obesity/overweight, increase physical activity, and/or improve nutrition/diet among youth (3-18 years). Related articles (i.e., those corresponding to an intervention or associational study) were grouped together into a “study grouping.” Study groupings were categorized into one or more of 24 independent strategies to increase healthy eating or active living. Investigators used the RE-AIM framework (i.e., Reach, Effectiveness, Adoption, Implementation, and Maintenance)<sup>13</sup> both to assess internal and external validity, and to derive standard, objective ratings of intervention effectiveness and impact for each study grouping. The assigned ratings were then entered into an Access database to generate reports for a range of indicators (e.g., outcomes assessed, intervention components, funding sources) within and across strategies.



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## Results

From 396 study groupings (600 independent articles) included in this analysis, 142 (36%) were intervention evaluations and 254 (64%) were associational studies. Reported outcomes varied, including physical activity (45%), obesity/overweight (25%), nutrition (18%), sedentary behavior (2%), and other shorter-term proxies, such as trail use or fruit and vegetable purchases (10%). Evidence for intervention effectiveness was reported in 56% of the evaluation, and 77% of the associational, study groupings. Among intervention evaluations, 49% had sufficient data for population impact ratings, and only 28% qualified for a rating of “high population impact.” Moreover, only 15% of intervention evaluations had sufficient data to provide high-risk population impact ratings, and only 9% qualified for a rating of “high” for high-risk population impact.

## Conclusions

This study employed ways to build on assessments of internal validity to rate effectiveness and to evaluate external validity to rate population impact, thereby helping to characterize and synthesize practice-based evidence.<sup>14-23</sup> Among studies eligible to receive ratings, investigators noted significant variation in methods, measures, and reporting. Other studies failed to report on key elements required for assessing the internal or external validity of intervention effects and impacts, including those elements specified by the RE-AIM framework.<sup>24</sup>

## Implications for Practice and Policy

This work helps to accelerate the pipeline of evidence, moving from evaluability assessments to syntheses of effectiveness and impact to rigorous expert review systems. To increase real-time evidence review and dissemination efforts, researchers and evaluators have to agree on standardized indicators and reporting mechanisms in all peer-reviewed publications.<sup>25,26</sup> This analysis identifies several indicators that can be incorporated consistently to improve review and reporting standards, thus enhancing the ability of evaluators to assess internal and external validity. In response, these efforts can more systematically enhance the knowledge base and improve recommendations for practitioners and decision-makers interested in childhood obesity prevention in both the general population and in high-risk populations.

## References

See attached document for list of references.

## Support / Funding Source

Support for this study was provided by a series of grants from the Robert Wood Johnson Foundation (#63675, 65518, 67413).



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## **Accelerometer Assessment of Children's Physical Activity Levels at Summer Camps**

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**Focus Area:** Research

### **Background and Purpose**

Approximately 14.3 million American children attend summer camps(1), which may last up to 10 hours/day for up to 12 weeks. There is some evidence that fitness gains and body weight reductions achieved from school-based interventions are not maintained during the summer months (2,3). The evidence base is growing for the impact out-of-school time (OST) programs can have on childhood obesity prevention, but little is known about children's activity levels in summer camps. Two assessments using systematic observation found that 20-25%(4) and 28%(5) of children were engaged in walking or vigorous activity at any time during camp hours. However, no known studies to date have assessed daily summer camp activity levels using accelerometers.

### **Objectives**

To assess baseline levels of physical activity via accelerometer among elementary school children attending summer camps, and to inform adaptation of an evidence-based afterschool obesity prevention program [Out of School Nutrition and Physical Activity (OSNAP) Initiative(6)] to the summer camp setting.

### **Methods**

This study used a cross-sectional and repeated measures design to assess accelerometer-measured physical activity levels among children ages 5-12 attending 5 summer camps in Boston, Massachusetts, from July-August 2013. Children attending 5 camps selected via convenience sample were recruited to wear accelerometers during camp hours for one week (5 days). Each consenting child wore an accelerometer (Actigraph GT3X/GT3X+, Pensacola, FL) on an elastic belt on the hip throughout the camp day except during swimming periods. Data collectors visited camps each day to observe activities and distribute and collect accelerometers. Primary outcomes were daily minutes of moderate-to-vigorous physical activity (MVPA) and vigorous physical activity (VPA) accumulated overall and occurring in bouts. Vertical axis intensity counts captured using the low-frequency extension were converted into minutes spent in MVPA and VPA using the Freedson(7) age-specific 1-minute cut points for children, at MET thresholds of 4 and 6 METs for moderate and vigorous activity, respectively. Linear regression analysis was used to estimate differences in daily activity levels according to demographic characteristics, adjusting for clustering of children within camps. Associations between daily activity levels and physical activity opportunities observed will be investigated to determine sources of daily variation in activity levels within children.

### **Results**

Among 184 children eligible and consenting to participate in the study, 153 children (83%) wore monitors on at least 2 days for at least 5 hours/day. Camp duration was 7.5-10 hours/day. Children were on average 7.6 (SD 1.4) years of age, and 47% were female. Children were multi-ethnic (8% White non-Hispanic, 37% Black non-Hispanic, 27% Hispanic/Latino, 3% Asian, 25% multi-racial/other race/ethnicity). Children wore monitors for an average of 4.2 (SD 0.9) days for 8.9 (SD 1.1) hours/day. On average, children attending summer camps accumulated 78.0 (SD 37.5) minutes/day MVPA overall, with 38.8 (SD 31.1) minutes/day in bouts. They accumulated 17.0 (SD 13.4) minutes/day VPA overall, with 3.2 (SD 6.8) minutes/day in bouts. Among 77 children with 5 monitored days, 23 (30%) met recommendations for 60 minutes/day MVPA on all 5 days, and 22 (29%) met recommendations on 4 days. Since activity levels during swimming periods were not captured via accelerometer, these results likely underestimate actual





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physical activity levels. In multiple regression analysis accounting for clustering within camps, results showed that boys were more active than girls (Beta=11.9 minutes/day MVPA overall;  $p=0.01$ ), and younger children were more active than older children ( $B=9.1$  minutes/day MVPA per year of age;  $p<0.001$ ). No differences by race/ethnicity were found. Activity levels differed significantly between camps ( $p<0.001$ ; range 54.9-118.3 minutes/day MVPA), and were highly clustered among children within camps (intraclass correlation=0.37 for MVPA overall).

### Conclusions

Elementary school children attending summer camps in Boston, Massachusetts achieved, on average, daily recommended levels of MVPA during camp hours. Males and younger children engaged in higher levels of physical activity. Both males and females achieved overall MVPA levels (86.3 and 68.6, respectively) during the camp day similar to national objectively-measured averages above 4 METs (95.4 and 75.2 for 6-11 year old males and females)(8). Analysis of variation in activity levels according to duration and types of physical activities offered to children attending camps will provide further insight into potential areas of intervention. Additional research will assess foods and beverages consumed in summer camps and thus describe overall energy balance among children during the summer months.

### Implications for Practice and Policy

This study lays the groundwork for adapting successful OST interventions designed for traditional afterschool programs to full day summer camps. Results indicate that activities in summer camps may need to be targeted to engage females and older children in recommended levels of physical activity. As community leaders work to disseminate evidence-based physical activity and nutrition interventions in Boston and nationwide, these results will help them set realistic goals. In Boston, academic and city agency partners will use these results to inform dissemination of the OSNAP intervention via the Racial and Ethnic Approaches to Community Health (REACH) Obesity and Hypertension Demonstration Project.

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## **Youth Advocacy for Policy, Systems, and Environmental Changes for Healthy Eating/Active Living: Pilot Evaluation of the Healthy Young People Empowerment (HYPE) Project**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

Modifying community policies, systems, and environments (PSE) are promising strategies for combatting population-level obesity concerns. Creating communities conducive to healthy eating/active living (HE/AL) will require engaging multiple constituencies [1] and youth voices can be especially powerful in influencing the priorities and decisions of policymakers [2]. Indeed, youth advocacy for obesity prevention has been called the next wave of social change for health [3]. However, few published studies illustrate the implementation or evaluation of initiatives designed to engage youth in PSE change for HE/AL.

This abstract describes the evaluation of the Healthy Young People Empowerment (HYPE) Project, including preliminary outcomes and lessons learned from three pilot communities.

### **Description**

The HYPE Project was developed to enhance the capacity of adolescents (12-17, especially from low income and minority backgrounds) to plan and implement PSE change projects centered around community HE/AL needs. HYPE was guided by the MATCH model of health promotion [4] as well as empowerment/positive youth development theories within a social ecological framework [3,5,6]. The HYPE Project consists of facilitator-led, 60-minute sessions through five progressive stages (Think, Learn, Act, Share, Evaluate) and culminates in a youth-led community PSE change project.

In 2012-2013, a total of 45 youth from three counties in South Carolina participated in the pilot year of HYPE. Throughout the five phases of HYPE, youth groups engaged in several major activities that developed individual and group skills and facilitated advocacy efforts. These included: identification of community PSE concerns via Photovoice [7], an environmental audit, development of an action plan, establishing relationships (e.g., with agencies, media, adults), and advocacy for implementation of their project.

Process and outcome evaluation included a curriculum content review by an advisory board (e.g., structure and content, appropriateness for age, race/ethnicity, and readability) and monthly facilitator reports (e.g., attendance, content covered). Additionally, trained researchers conducted focus groups and informal discussions with youth, observations of HYPE sessions, and surveys and interviews with adult facilitators. A lead evaluator and two trained researchers conducted a qualitative analysis of all data.

### **Lessons Learned**

The youth groups in the three pilot communities each achieved success to varying degrees. In one community, youth created a detailed plan for improving amenities in a local park (e.g., restroom cleanliness, drinking water, safety), but struggled to achieve changes due to limited communication response from city officials. In a second community, youth advocated for healthier food choices at a local sports complex, but met with resistance from facility management for implementing changes. Finally, youth in the third community successfully advocated and acquired approval for the addition of a walking trail and bike racks in their local park.



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Experiences with these initial groups provided numerous lessons that can inform future iterations of the HYPE Project. A major lesson learned regarding youth empowerment was the importance of recognizing and respecting diversity in youth knowledge and interest for PSE change and HE/AL, at both the individual and group level. For example, focus groups indicated that some youth were excited and ready to participate in community change whereas others were still learning about and satisfied to experience positive changes in personal health (including weight loss). As well, researcher observations regarding the reasons youth groups were together (e.g., existing afterschool program vs. purposeful HYPE group) affected how focused the youth were on making HE/AL PSE changes. Likewise, making the curriculum youth-oriented, interactive, and relevant was seen as key to achieving youth engagement and action. For instance, discussions with youth revealed that those who participated in observations, interviews, and assessments within their communities were more likely to report feelings of empowerment. Further, adult facilitators and their HE/AL PSE knowledge and competency, relationships with youth, and capacity to foster group cohesion were vital for youth engagement and successful advocacy efforts. For example, interviews with adult advisors indicated that familiarity with curriculum concepts and working with children allowed them to be flexible and adapt the curriculum to fit the preferences of the youth, thereby creating youth ownership and accountability for their HYPE projects. Finally, given the nature of resistance met by youth groups during advocacy attempts, educating community members and decision-makers may be essential before youth are seen as viable PSE change agents.

### Conclusions and Implications

The HYPE Project and similar youth empowerment initiatives across the U.S. provide a sustainable vehicle for realizing long-term changes to policies and environments that promote HE/AL. Better understanding ways to develop youth into community resources for PSE change can inform interventions aimed at improving community environments and reducing obesity.

### Next Steps

Lessons learned from this pilot year will be used to revise the HYPE curriculum. The next round of six youth groups will begin HYPE in Fall 2013, with a goal of achieving 30 HYPE groups across South Carolina by 2015. Rigorous evaluation efforts will explore outcome measures related to youth capacity (awareness, skills, empowerment, self-efficacy) and community change (improved policymaker attitudes and intentions, PSE modifications).

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### **Informing Mississippi Legislators of Factors Associated with In-school Physical Activity Policy and Practices in Rural, Low-income, Predominantly African American School Settings**

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**Focus Area:** Research

#### **Background and Purpose**

In 2007, the Mississippi (MS) legislature acted to improve health and reduce childhood obesity through the MS Healthy Students Act (SB 2369) (1), which mandates school-age students engage in specific amounts of in-school physical activity (ISPA). However, schools in predominantly rural, low-income, racially concentrated communities are not meeting the provisions of the law (2) and there are increasing disparity gaps in childhood obesity between black (27.8%) and white (19.5%) students.(3) As facilitators linked to successful ISPA policy implementation are identified, the dissemination of best practices is pertinent and likewise, as barriers are revealed there is a need to develop and disseminate effective ISPA strategies.(4) Furthermore, it is important that these outcomes are identified as relevant by legislators and inform future decisions related to childhood ISPA, obesity and health disparities. Thus, the purpose of this investigation was to disseminate evidence-based findings to state policy-makers, and to identify and disseminate ISPA best practices at the district- and school-levels in the MS Delta.

#### **Objectives**

1) Translate and disseminate research findings to inform key lawmakers in the MS legislature; 2) Identify ISPA best practices at the school- and district-levels in the MS Delta; and 3) Foster collaboration among researchers, state agencies, and organizations that focus on reducing childhood obesity and child health disparities.

#### **Methods**

A collective case study (5) approach was used to investigate ISPA policy implementation in the MS Delta. Qualitative data collection procedures included: 1) two focus groups with school principals (n=11) and two interviews with district-level administrators to understand an administrator's role in developing and implementing ISPA policy, to identify barriers to implementation, and to reveal best practices; 2) two focus groups with PE teachers (n=21) to identify barriers to implementing PE curricula and to reveal best practices; and 3) two focus groups with elementary school students (n=16) to identify ISPA that students typically engage in and want to engage in, and to identify how frequently students are engaged in and want to engage in ISPA. Audio recordings were transcribed, verified, and consensus rendered by two co-investigators. Transcendent themes that emerged from the transcripts were identified within and across groups to provide a detailed description of factors that influence ISPA policy.(5)

#### **Results**

Students recognized the importance of ISPA for academic achievement, enjoyed having physical activity integrated into classroom learning, and valued PE and recess. Students were most interested in dance activities, organized competitions (i.e., obstacle courses, races), and sports (males). Some students believed they had ample time for ISPA while others did not.

PE teachers identified four primary barriers to implementing PE curricula: 1) schedules do not provide ample time for students to learn, practice, and master skills, 2) limited monetary resources for staff support, space, and equipment, and 3) lack of state, district, and school administrative support for PE, which 4) fosters a school-wide devaluing of the PE teacher and PE program. However, PE teachers that demonstrated successful ISPA practices had strong support from their principals and reported having strong community partnerships/collaborations.



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The principals agreed that academic achievement is their primary concern but also recognized the importance of ISPA in achieving academic success and acknowledged funding as a barrier. Principals with successful ISPA programs reported having strong community partnerships/collaborations and those with less successful programs reported rurality and location as challenges to creating community partnerships/collaborations. Other successful practices included policies that incorporated “brain breaks” and physical activity into classroom instruction.

The district curriculum coordinator was aware of the state ISPA requirements and took responsibility to ensure the requirements were met by communicating with principals and conducting PE evaluations. The superintendant was familiar with the requirements but believed it was the responsibility of the principals to develop and implement ISPA policy.

### **Conclusions**

Most district- and school-level personnel in the MS Delta recognize the importance of ISPA for students’ academic success but acknowledge there are formidable challenges. Despite these challenges, there are schools in the MS Delta with successful ISPA programs. A key concept is having a school principal that serves as an “ISPA champion” and plays an integral role in creating a school culture that values ISPA. The principals’ excitement for ISPA inspires teachers and students to support ISPA.

### **Implications for Practice and Policy**

The most rural schools need assistance in developing and implementing ISPA policy to provide the most disadvantaged, at-risk students with sufficient ISPA opportunity. Policy-makers need to be informed of successes and challenges of the MS Healthy Students Act. There is urgent need for specific policy to address rural and racial child health disparities. Advising policy-makers of the evidence-based outcomes will help them make informed decisions regarding ISPA and childhood obesity polices. Thus, we have a meeting to discuss the results of this project with MS legislators and other stakeholders in October 2013. In addition to the results of this project, we will be able to share the outcomes of this meeting at the ALR annual meeting.

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### **Support / Funding Source**

This investigation is funded by Active Living Research Translation Awards (RWJF #67132).



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## **2013 Texas Legislator Health Perception Survey: Determining Texas State Legislators' Attitudes and Support for Physical Activity-focused Policies**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

During the past 15 years, the Texas State Legislature has passed several progressive policies related to physical activity. These policies have predominantly focused on requirements for coordinated school health programs, for oversight of physical activity and nutrition school policies by School Health Advisory Councils (SHACs), and for requirements for Fitnessgram testing. These policies have been supported by the Partnership for a Healthy Texas (the 'Partnership'), a coalition composed of stakeholders focused on obesity prevention through policy change; the Partnership has made significant and incremental gains in obesity prevention-related legislation since 2001. Evaluation of the physical activity policies implemented in Texas has shown significant changes in school environments and physical activity among public school children.

The recent turnover in the Texas Legislature because of the 2012 election has resulted in over 50% of Texas State Legislators (181 in total) being new or junior members. Thus, many of the new legislative members and their staff have limited knowledge of previous legislative history, educational activities, and obesity issues in Texas. This situation has created a challenge for the successful dissemination of research findings and potential for continued impact on policy actions. Information is needed on current legislative knowledge and resources related to childhood obesity so our policy-focused partners can develop both effective communications and strategic dissemination efforts for childhood obesity-related legislation.

### **Description**

The primary focus of this project funded in November 2012 was to assess the knowledge, attitudes, and perceptions about obesity prevention and control measures of legislators from the 83rd Texas legislative session. The purpose of this presentation is to present results for physical activity and related environmental changes.

This mixed-methods study included a cross-sectional quantitative survey conducted among the Texas legislature, together with qualitative interviews with a subset of legislators. Survey questions were drawn from previously used legislative surveys and adapted specifically for the Texas environment and policy targets. Investigators collaborated with an Advisory Board consisting of members of the Partnership, as well as other stakeholders, such as the Texas Medical Association and University governmental liaisons, to identify appropriate survey topics and legislative language/wording to develop the survey. A complete legislator listing, including both descriptive and contact information, was compiled prior to the start of the session in January, 2013; a total of 181 legislators were identified from both the House and the Senate. Letters of introduction and copies of the survey were distributed to all legislators, along with a link to an online survey during March, 2013. Surveys were administered by hardcopy, online or by interview, as most convenient for the legislator/staff person.

Interview questions were created and administered to a targeted group of representatives from certain legislative committees: Appropriations, Education, Finance, Health & Human Services, Public Education, Public Health, Transportation, and the Farm to Table Caucus.





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Data collection continued through the end of the third special session (August 2013). Quantitative survey data are compiled and presented in aggregate. Interview data were reviewed for common themes, and were triangulated with survey quantitative results.

## **Lessons Learned**

Through the end of August, a total of 81 surveys were collected (45% response rate), with an approximately equal split between Republicans and Democrats ( $n = 40$  and  $39$ , respectively), and 68 House and 11 Senate members/staff; in addition, 16 interviews were completed ( $n = 9$  House and 7 senate members/staff). Preliminary results indicate policy recommendations with strong legislator support included improving nutrition and physical activity in early childhood programs, enhancing community environments to promote physical activity, providing more physical activity in schools, and supporting coordinated school health programs that increase physical activity and nutrition education. Policy recommendations with little support generally included limiting sales of foods. Legislators generally believed that the groups with the biggest role in righting obesity in Texas were individuals, parents & families, and healthcare providers; transportation groups were mentioned as the least likely to have a role in fighting obesity. Funding and personal responsibility were listed as the biggest obstacles for passing obesity prevention-related legislation. Most Texas legislators and their staff cited the use of online resources as a primary source of information (e.g., websites, Google).

## **Conclusions and Implications**

In general, Texas legislators support physical activity-related policies; however, some key sectors that influence physical activity (e.g., transportation groups) are not seen as playing a key role in obesity prevention.

## **Next Steps**

Communications to address physical activity policies should be framed to address funding and individual-level concerns. In particular, more efforts should be devoted to educating legislators about the role of transportation resources and policies in increasing physical activity. Resources for legislative action need to be available on the Internet, and search terms for websites and other resources should be optimized to allow for easy access.

## **Support / Funding Source**

This study was funded by the Robert Wood Johnson Foundation (Grant ID: 70474) with contributions from The University of Texas Health Science Center at Houston, School of Public Health Austin Regional Campus; the Michael & Susan Dell Center for Healthy Living.



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### **Learning from the Economists: Using an Elasticity Analysis to Assess Changes in Screen-time in Response to a Temporary “Pop-up” Park in California**

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**Focus Area:** Research

#### **Background and Purpose**

Screen-time is a common proxy measure for sedentary behavior, which is a risk factor for certain chronic diseases independent of moderate-to-vigorous physical activity (1,2). Park use and park exposure have been positively associated with leisure-time physical activity (3), but few studies have documented the relationship between park availability and screen-time (4). Cross-elasticity is a common measure in economic research to report the change in demand of an item given an increase in price of another item. In active living research elasticity analysis can be used to understand changes in time-allocation patterns in relation to built environmental changes (5). Natural experiments have been identified as a research priority to understand the causal relationship between built environment features (like park availability) and changes in health behaviors. During the summer of 2013, we took advantage of a natural intervention involving a temporary modification of the urban landscape of downtown Los Altos, California (28,976 inhabitants), where a main street block was closed due to construction and transformed into a temporary park. During this time, we conducted a study to examine the relationship of park exposure with time allocated to screen time and other activities.

#### **Objectives**

1. To estimate the type and prevalence of activities that temporary park-use displaced (defined as alternate activities).
2. To conduct a cross-elasticity analysis to estimate the number of minutes of alternate activities (screen-time, time spent at any different park, time spent in downtown Los Altos, time spent outdoors) gained or lost due to the presence of the temporary street park.

#### **Methods**

Researchers from the Stanford Prevention Research Center designed and conducted an intercept survey for users of the temporary street park of downtown Los Altos. Surveys were administered during a four day period, including two week days and two weekend days. Survey respondents reported the amount of time that they intended to spend at the park that day, as well as the type of activity they would regularly be doing during that time if the temporary street park were not available (i.e., alternate activities). Alternate activities were coded as the following binary variables: screen-time vs. non screen-time, spending time in a park vs. spending time elsewhere, spending time in downtown Los Altos vs. spending time elsewhere, and spending time outdoors vs. spending time indoors. Prevalence was estimated per category. To obtain cross-elasticity estimates, we ran multivariate linear regression models using minutes of screen-time, minutes of total park use, minutes of outdoor time, and minutes spent in downtown Los Altos as the dependent variables; park availability was used as the independent (exposure) variable. All models controlled for effects of sex and age. The regression coefficients for the effect of park availability represented the number of minutes gained or lost per alternate activity due to park presence.

#### **Results**

A total of 147 park-users were surveyed. Of the sample, 62.5% were female, 5.5% were children, 6.8% were adolescents, 66.7% were adults and 20.4% were seniors. Among survey respondents, 15.0% reported that if the temporary park was not available they would be spending that time in front of a screen. Meanwhile, 64.6% would regularly be at an indoor location at time of survey, 40.8% would be



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spending time in downtown Los Altos regardless of temporary park availability, and 15.7% would be spending time at another park. The elasticity analysis revealed that among survey respondents, the presence of the temporary park was associated with 77.4 fewer minutes of screen-time, 72 additional minutes of time spent at a park, 88.6 additional minutes of time spent in downtown Los Altos, and 76.1 additional minutes of outdoor-time.

### Conclusions

Our results indicate that the presence of a temporary 1-block street park located in the heart of the downtown shopping district of Los Altos, California was associated with positive changes in time-allocation patterns, including a significant reduction in screen-time and a significant increase in time spent in a park. Larger studies are needed to estimate the elasticities of time-allocation in relation to the availability of public spaces, such as parks, to verify our findings. Future studies should also take place in locations where environmental changes are intended to be long-term/permanent.

### Implications for Practice and Policy

This study provides valuable evidence supporting the creation of parks and open spaces in high land-use mix urban areas. Our findings (more time spent in downtown Los Altos due to park availability) also suggest that the presence of public recreation spaces may have benefits beyond health behaviors, and may also contribute towards the revitalization of downtown shopping districts in small cities. These potential benefits should be further explored, as they may be more likely to influence the decisions of stakeholders for the creation of parks than health-related benefits.

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**Cross-Elasticity of alternate activities in response to park presence among users of the temporary street-park of downtown Los Altos, California (summer 2013).**

\* Cross-Elasticity estimates represent linear regression coefficients, where the alternate activity is the dependent variable and park presence (1=yes, 0=no) is the independent variable. All models are controlled for the effect of age and sex.

Alternate Activities	Cross-Elasticity Estimates*	95 % C.I.
(regular activities in which respondents would be engaged in if park was not present)	(Minutes gained or lost due in association to park presence)	
<b>Outdoor time</b> (ref: indoor time)	+ 76.1 minutes	(58.3, 94.0)
<b>Time spent in Downtown Los Altos</b> (ref: time spent elsewhere)	+ 88.6 minutes	(71.8, 105.3)
<b>Time spent in a park</b> (ref: time spent elsewhere)	+ 72.0 minutes	(46.8, 97.2)
<b>Time spent in front of a screen</b> (ref: time spent elsewhere)	-77.4 minutes	(-103.5, -51.2)



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### **Moving Towards Implementation: The Potential for Accountable Care Organizations and Private-public Partnerships for Neighborhood Active Design**

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**Focus Area:** Practice/Policy

#### **Background and Purpose**

How can the Affordable Care Act benefit the neighborhood built environment? Accountable care organizations (ACO's), a relatively new model of healthcare delivery, may be a critical component to the multidisciplinary partnerships necessary to build healthy communities. The model, which rewards doctors and hospitals for health maintenance rather than health care provision, is a logical outgrowth of health reform measures designed to improve patient outcomes and reduce costs. In the wake of the new law, as health care systems reinvent themselves to maintain viability and profitability, ACOs will continue to proliferate across the nation, presenting a timely opportunity for organizations looking to move active living research into built realities.

As defined by a task force of the American Academy of Family Physicians, an ACO is "a primary care-based collaboration of health care professionals and health care facilities that accept joint responsibility and accountability for the quality and cost of care provided to a defined patient population." They are a relatively new phenomenon; currently ACOs now number more than 400, but cover four million Medicare enrollees and millions more people with private insurance.

Because ACO profits will be tied to keeping their patient population healthy, and recruiting health-minded patients to select their ACO, these healthcare organizations are expected to play increasingly active roles in promoting community health by aligning with public health, local government community development departments and community-based organizations (CBO). Armed with new growing empirical evidence on the relationship between the built environment and preventative health behavior, ACO's can potentially help fund and direct neighborhood health programs such as tree planting initiatives, retrofitting parks with walking paths, or sponsoring farmers' markets. ACO's can also influence community and regional health by providing grant match dollars needed for transportation projects to improve transit access, close sidewalk gaps and advance complete streets. Supporting this type of neighborhood, community and regional development can further improve health, supports the work of physicians in encouraging consumers to increase physical activity, and reduces the need for costly medical care.

#### **Description**

This research collaboration which includes professionals and researchers at Sutter Eden Medical Center, Kaiser Permanente, and Design 4 Active Sacramento (D4AS), a community-based organization and advisory council in Sacramento, California, discusses the nature and growth of ACO's in the wake of the Affordable Care Act, and its potential for active living initiatives. Using our current work in Sacramento as a case study, we outline how we have already established partnerships between public health, local government, and community based organizations to fund and implement interventions in the built environment.

#### **Lessons Learned**

D4AS has already begun the process of implementing active design guidelines and programs such as improved access to transit, complete streets initiatives, sidewalk gaps closures, and a Safe Routes to School initiative. We discuss how they have leveraged these guidelines and programs into existing infrastructure and new development projects by strategically reaching out to other agencies and organizations and focusing on the monetary benefits of active design, from attaching "price tags" to and



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quantifying benefits of these programs for outside investment, to finding and structuring federal grant match programs.

### **Conclusions and Implications**

By examining both the challenges and potential in healthcare provider partnerships and quantifying costs and benefits of active design implementation, we aim to lead a practical discussion on beginning to translate the vast research on active living into realized projects in a new era of healthcare healthcare delivery.

### **Next Steps**

We outline our current and future efforts in integrating healthcare providers, with a specific focus on ACO's, in the wake of the Affordable Care Act.

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### **Support / Funding Source**

The Design 4 Active Sacramento team was one of 20 teams nationwide chosen this year by the US Centers for Disease Control to participate in the National Leadership Academy for the Public's Health.





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## **If You Build it...Do it Safely! Building in Safety While Creating Active Environments**

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**Focus Area:** Practice/Policy

### **Background and Purpose**

In the U.S., diseases related to obesity and physical inactivity are among the leading causes of death, and as a result, built environments are being modified to promote daily activity during work, travel, and play. Efforts to promote environments that facilitate opportunities for physical activity should consider the fact that injuries are the leading cause of death for Americans ages 1 to 44, with transportation-related injuries the most common cause. Urban design strategies for safe neighborhoods, streets, and outdoor spaces can be implemented to reduce injuries while simultaneously encouraging walking and bicycling and increasing access to public transit. Building design strategies that affect where individuals live and work can also be implemented to promote both an active lifestyle and safety (e.g., safe design of stairs). Drawing on the latest academic research and best practices in the field of injury prevention, the purpose of this project is to provide those working to promote physical activity with evidenced-based recommendations on how to build in safety while designing active environments.

### **Description**

In 2010, twelve New York City (NYC) government agencies collaborated to create the Active Design Guidelines (ADG) ([www.nyc.gov/adg](http://www.nyc.gov/adg)), which provided evidence-based and best practice urban and building design strategies for creating environments that promote daily physical activity. With support from the CDC, partners from the Johns Hopkins Center for Injury Research and Policy, NYC's Health Department and Department of Transportation, and the Society for Public Health Education developed a supplement to the ADG, Promoting Safety, which provides information that links safe design and active design strategies. A systematic review of the existing literature was conducted to identify injury prevention strategies applicable to the ADG objectives. Injury prevention strategies were rated as strong, emerging, or best practice, according to the strength of the supporting research evidence. We identified 18 urban design strategies and 9 building design strategies that promote safety and physical activity. Evidence was strong or emerging for 14/18 urban design strategies and 7/9 building design strategies. The product that resulted included a summary of the strategy, evidence, rating, visuals, and a matrix to illustrate how active design objectives relate to safety promoting strategies. The product was designed for print and online dissemination, and was peer-reviewed by injury prevention professionals, design and transportation experts, and key stakeholders.

### **Lessons Learned**

Since this work was interdisciplinary and transdisciplinary, we learned the importance of framing and language to meet the needs of a variety of audiences including health, safety, architecture, planning and transportation. In addition, because of the array of stakeholders who could potentially be affected by this work, we had to include additional time to ensure that we had reviews and buy-in from the different relevant groups. Finally, designs for safety and active living are often complementary and synergistic, which increases the likelihood that these strategies will be implemented.

### **Conclusions and Implications**

Several key findings emerged from the evidence reviewed. First, active design strategies are often wholly compatible with well-accepted injury prevention principles. One example is where properly built bike lanes



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offer good street connectivity and are supported with appropriate, well-displayed signage and traffic controls. Second, the safety of multiple active design strategies can often be enhanced simultaneously by a single injury prevention strategy. For example, improved timing of traffic signals benefits pedestrians, bicyclists, and transit users. It is also important to note that motor vehicle drivers and passengers will also be better protected when active design strategies that reduce crash risk, such as traffic calming, are implemented. Third, for several of the active design objectives reviewed, there is not yet evidence on the ways in which injury outcomes are involved, and further research is needed.

This project makes significant contributions to the field. By partnering with architects, planners and other transportation professionals, injury prevention and public health professionals can contribute to ensuring that new and renovated spaces maximize both active living and safety. The Active Design Supplement, Promoting Safety, is the first resource of its kind to meet that goal. This project is significant for the field because it highlights the importance of interdisciplinary collaborations to foster the creation of safe environments. It also emphasizes the critical role that injury prevention professionals have in ensuring safety is incorporated when interventions to promote activity are being developed in the future. Finally, this work highlights one approach to making these interdisciplinary partnerships between public health, architects, planners and other transportation professionals, more common and eventually the norm.

### **Next Steps**

Widespread dissemination is planned with targeted outreach to the active living community, planners, architects, and transportation professionals. We are also writing a peer review manuscript documenting this work.

### **References**

Johns Hopkins Center for Injury Research and Policy, NYC Health Department, and Society for Public Health Education. Active Design Supplement: Promoting Safety. 2012. Available at: <http://centerforactivedesign.org/promotingsafety>.

### **Support / Funding Source**

This document was supported by a cooperative agreement to the Society for Public Health Education from the U.S. Centers for Disease Control and Prevention (CDC) 1U58DP0001335.



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### **Built Environment Strategies for Cancer Control in Indiana**

*Emily Jones, BS<sup>1</sup>, Caleb Levell, BA<sup>2</sup>, Zia Brucaya, MS<sup>3</sup>*

*<sup>1</sup>ISDH, <sup>2</sup>IPHA, <sup>3</sup>Alliance for Health Promotion*

**Focus Area:** Practice/Policy

#### **Background and Purpose**

Cancer is the second leading cause of death in Indiana, killing approximately 12,000 Hoosiers annually. According to the American Cancer Society, more than half of all cancer deaths could be prevented by making healthy choices like being physically active and staying at a healthy weight. Unfortunately, 30 percent of Indiana adults are obese and 40 percent do not meet recommended physical activity guidelines (1). Given the burden of cancer, state cancer control programs and partner organizations are in a unique position to implement policy, systems, and environmental (PSE) change strategies to impact the burden of cancer. Complete streets policy adoption and implementation promotes physical activity, impacts disparities and benefits whole communities.

The Cancer Control Section (CAS) at the Indiana State Department of Health receives funding to prevent and control cancer in Indiana. The Indiana Cancer Consortium (ICC) functions as the state's vehicle for cancer control by educating on and advocating for a state-led policy agenda, which includes increasing the number of Complete Streets policies. The CAS and ICC work in tandem with the Indiana Complete Streets Coalition (ICSC) to implement and align shared objectives and activities. The CAS, ICC and ICSC support one another by advocating for Complete Streets infrastructure to make healthy choices the easy choice.

Since 2009, Indiana has adopted ten Complete Streets policies that cover over 2 million Hoosiers (37% of the population). Indianapolis now boasts the strongest Complete Streets ordinance in the nation (2) and the ICC's communications strategy, which included social media, earned media, and a unique Complete Streets infographic (See Figure 1), was vital to garner public and legislative support throughout the three-year policy advocacy process. Due to ongoing efforts of the ICSC, several more Indiana communities are drafting and considering Complete Streets policies.

#### **Description**

One-quarter to one-third of new cancer cases expected to occur in 2013 in the United States will be related to overweight or obesity, physical inactivity and poor nutrition, and could be prevented (3). Although healthy choices are made by individuals, they may be facilitated or impeded by the social, physical, economic and regulatory environment in which people work, live and play. Research shows people living in walkable neighborhoods completed 35-45 more minutes of physical activity weekly and were substantially less likely to be overweight or obese than people living in low-walkable neighborhoods (4). Unfortunately, Indiana communities are not consistently walkable or bikeable, contributing to declining health and over-dependence on driving. Thirty extra minutes in a car is linked with a three percent increased risk of obesity (5). With the growing evidence-base linking health and transportation, built environment solutions that promote active transportation are a priority.

#### **Lessons Learned**

A need exists to establish standardized methodologies for capturing physical activity rates before, during and after Complete Streets policy implementation. Indianapolis now conducts bicycle and pedestrian counts bi-annually using a nationally-recognized methodology, and posts results online to promote transparency and public engagement. More Hoosier communities must track performance measures to demonstrate the impact of Complete Streets policies on active transportation and to support long-term evaluation and research efforts.



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### **Conclusions and Implications**

Complete Streets policies support equitable treatment regardless of age, gender, race/ethnicity or ability. They improve active transportation opportunities in traditionally under-served, low-income neighborhoods and ensure that vulnerable populations are not disproportionately disadvantaged by car-oriented development. Complete Streets policies also benefit Safe Routes to School by turning all routes into safe routes. As more Hoosiers gain access to Complete Streets, active transportation opportunities increase, benefitting Indiana's comprehensive cancer control efforts.

### **Next Steps**

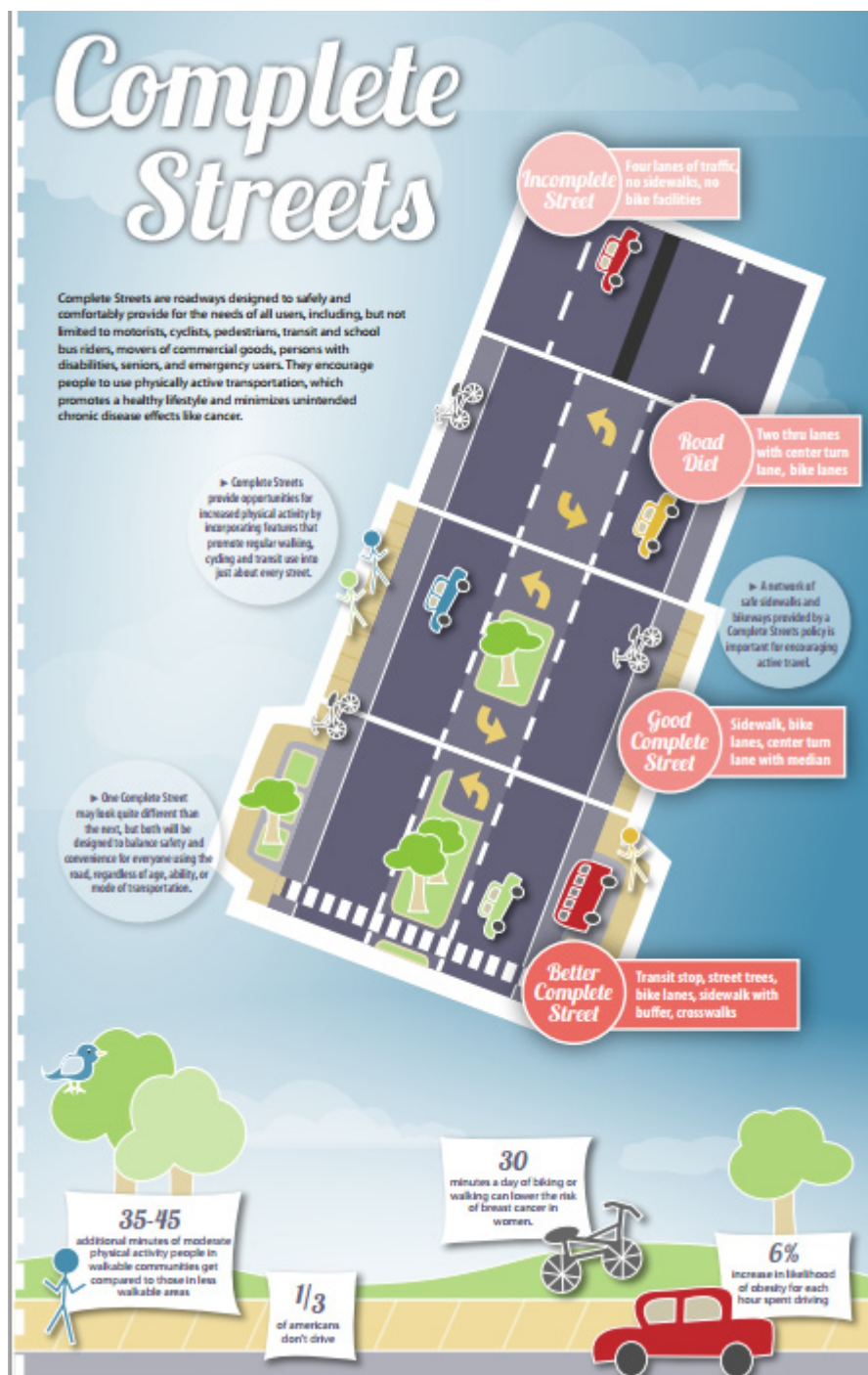
Complete Streets policy implementation and program evaluation is necessary to sustain funding and statewide support. To yield research and evaluation results, CAS, ICC and ICSC are partnering with researchers to measure communities' progress where Complete Streets are happening. Adult and adolescent physical activity, overweight and obesity and cancer-related rates and trends will be measured and examined prospectively. Results will be effectively communicated to key stakeholders supporting PSE strategies to prevent and control cancer in Indiana.

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### **Support / Funding Source**

Funding was made possible (in part) by the cooperative agreement award U55DP003020 from the Centers for Disease Control and Prevention.





### Physical Activity & Obesity Facts

Evidence suggests that nationally about one-third of the 571,950 cancer deaths expected to have occurred in 2011 were related to overweight or obesity, physical inactivity, and poor nutrition and thus could have been prevented.

Excess weight and lack of sufficient physical activity are linked to: cardiovascular disease, hypertension, diabetes, cancer, and arthritis

29%

of Hoosier adults get no physical activity and 76% of high school students don't get the recommended 60 minutes of physical activity a day

66%

of Hoosier adults and 30% of high school students are obese or overweight

► Incomplete streets mean many people lack opportunities to be active as part of daily life.

### Success stories

The positive impact Complete Streets policy adoption has had on health and the economy in U.S. communities.



### Where policy change is happening



- Valencia St - San Francisco: Nearly 40 percent of merchants reported increased sales, and 60 percent reported more area residents shopping locally due to reduced travel time and convenience. Overall, two-thirds of respondents described the increased levels of pedestrian and bicycling activity and other street changes improved business and sales.
- Barracks Row - Washington, DC: After many design improvements, which included new patterned sidewalks, more efficient public parking, and new traffic signals, Barracks Row attracted 44 new businesses and 200 new jobs. Economic activity has more than tripled since the inception of the project.
- Portland, Oregon: A report estimated that a regional trail network saves the city approximately \$115 million per year in healthcare costs.
- South Carolina: After a bike and pedestrian lane was installed on a local bridge, 67% of users indicated that their activity levels had increased since the opening of the lane.

- Cities and Towns Considering Complete Streets Policies
- Existing Complete Streets Policies (Cities and Metropolitan Planning Organization)

Complete streets make economic sense. Complete streets improve safety. Complete streets encourage walking and biking. Complete streets ease transportation woes. Complete streets benefit children. Complete streets are good for air quality. Complete streets make fiscal sense.

Join us at [IndianaCancer.org](http://IndianaCancer.org) and support Complete Streets in your area!

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### **Average Daily Traffic and User Miles Traveled: New Performance Measures for Urban Multiuse Trails**

*Greg Lindsey, PhD<sup>1</sup>*

<sup>1</sup>*University of Minnesota*

**Focus Area:** Practice/Policy

#### **Background and Purpose**

Background: Managers of urban multiuse trails historically have not measured traffic volumes or miles traveled by users of trail systems. With increased budgetary pressure and demands for accountability, trail managers need consistent information about trail use. Transportation planners and engineers have developed systematic procedures for monitoring motor vehicle traffic and estimating average daily traffic and miles traveled on road networks. These measures are used for a variety of purposes, including allocation of resources for capital improvements and maintenance. In this paper, we illustrate how local planners and engineers can estimate annual average daily traffic and user miles traveled on urban trail networks by implementing a coordinated monitoring system that includes a small number of continuously monitored reference locations and systematic short-duration counts on all trail segments within a network.

#### **Description**

Methods: Continuous counts of non-motorized traffic were collected from 2011 at 6 locations on the off-street trail network in Minneapolis, MN. Using these data we developed a new approach – use of day-of-year factors – for estimating AADT from short-duration counts. In year-2013 we deployed 6 mobile counters (in addition to the 6 reference site monitors) to estimate non-motorized traffic on the entire off-street trail network (~80 miles). We collected short-duration counts (i.e., 1-week) at 78 locations and subsequently estimated (AADT) and User Miles Traveled (UMT) for each trail segment. We then use these estimates to map trail traffic and explore relationships between trail traffic and neighborhood design.

#### **Lessons Learned**

Results: We successfully deployed a non-motorized traffic monitoring program on the off-street trail network in Minneapolis, MN. We have 4 core results that may be useful for developing non-motorized monitoring programs in other areas:

1. A system of short-duration and reference site measurements can yield spatially precise performance measures of trail traffic for an entire trail network.
2. Day-of-year scaling factors have smaller error than the standard method used by transportation agencies (day-of-week and month-of-year) in estimating AADT, especially from shorter duration (<1 week) counts.
3. Extrapolation error decreases with the length of the short-duration counts, with only marginal gains in accuracy with counts longer than one week.
4. Error in estimating AADT is lowest when short-duration counts are taken in summer (or spring-summer-fall) months (April-October) in Minneapolis, MN.

#### **Conclusions and Implications**

Policy implications: Trail managers can develop performance indicators comparable to those used routinely in planning for motorized traffic networks. We were able to estimate annual traffic for an urban trail network (~80 miles) using a relatively small number of monitors (n=12) in 7 months. Spatially precise information on trail traffic may be helpful to policy-makers interested in planning for active travel. Analysts can use day-of-year factors to increase accuracy of estimates of AADT.



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## **Next Steps**

Our next steps include working with additional communities in the metropolitan region to develop regional performance measures.



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## **The Effects of Bicycle Boulevards on Adult's and Children's Walking and Bicycling Behavior: Findings from a Longitudinal Panel Study**

*Jennifer Dill, PhD<sup>1</sup>, Joseph Broach, MA<sup>1</sup>, Nathan McNeil, MURP<sup>1</sup>*

*<sup>1</sup>Portland State University*

**Focus Area:** Research

### **Background and Purpose**

Research demonstrating the links between the physical environment and walking and bicycling has been reviewed extensively (Owen et al. 2004, Saelens et al. 2003, Ogilvie et al. 2006, Transportation Research Board and Institute of Medicine 2005). Much of the research has focused on adult behavior and few studies explore bicycle-specific infrastructure. Moreover, Pucher, Dill and Handy (2010) found that only a handful of studies were longitudinal, including a control sample. A review of research on environmental correlates of children's active transportation (Pont et al, 2009) included 38 peer-reviewed articles, though none with longitudinal data.

The role of specific types of bicycle infrastructure in cyclist's route choice decisions was examined by Broach, Dill, and Gliebe. Using GPS data from adult cyclists, they found a preference for separated paths, followed by bicycle boulevards. Bicycle boulevards are a form of traffic calming on residential streets that give bicycles priority over motor vehicles. This is done through the installation of a combination of traffic calming techniques, such as traffic diverters (which force cars to turn, but bikes and pedestrians can travel through), speed humps, and chicanes and bulb outs (which narrow the street). The boulevards are signed as bicycle routes. When a bicycle boulevard crosses a busy street, traffic signals are sometimes installed to assist cyclists in crossing safely. Stop signs along the street are reversed, so that cross traffic is stopped, rather than the through traffic on the boulevard. Motor vehicle traffic on the streets is much lower than nearby parallel streets, since through traffic is discouraged, and traffic speeds are about the same as bicycles because of the treatments.

Traffic is a major barrier to both adults and children cycling and walking more. In a random phone survey of Portland adults, "too much traffic" was the primary environmental barrier cited by respondents who wanted to bicycle more (Dill and Voros 2007). Of the adults who were not cyclists, but wanted to cycle more, 60% cited traffic as a barrier, while 33% cited the lack of bike lanes/trails, the next highest response; 65% of the adults who only cycled for recreation cited traffic as a barrier. In a national survey, 40% of parents cited traffic danger as a barrier for their children walking and cycling to school, second to long distances (55%) and significantly higher than crime danger (18%) (Dellinger and Staunton 2002).

### **Objectives**

The overall aim of this research was to evaluate the effects of new, innovative infrastructure on physical activity (PA) of families with children. More specifically, the research:

1. Evaluated the effects of new bicycle boulevards (a form of traffic calming) on PA
2. Examined PA for both recreation and transportation
3. Considered other correlates of PA, including socio-demographics, social factors, attitudes, and other physical environment factors, using an ecological model

### **Methods**

The Family Activity Study is a longitudinal panel study of the effects of bicycle boulevards on bicycling and walking behavior. The study started with 333 families with children living in 19 study sites (nine treatment and ten control) in the City of Portland, OR. This included 495 adults, 325 children ages 5-10, and 176 children ages 11-17. About 80% of the sample completed all phases of the study. Surveys were conducted at three points in time: Pre, Post, and Interim. The Pre and Post surveys are approximately



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two years apart, with bicycle boulevard construction occurring in between. The Interim surveys were fielded about one year after the Pre surveys, during the phased construction of the projects. The surveys (adults and children) includes personal and household socio-demographics, subjective perceptions of their neighborhood environment, travel attitudes, social norms, self-efficacy towards travel behavior, and self-reported biking and walking behavior. GPS (the GlobalSat DG-100) and accelerometer (the ActiGraph GT3X) data were collected from adults and children for five days during the Pre and Post periods. Data collection was completed July 2013. GPS data are processed to detect mode of transportation (drive, bike, walk, transit, other) and link to the transportation network.

### Results

Post data collection was completed one month ago, and data are still being processed and cleaned. During the Pre data collection phase, adults in the control neighborhoods walked an average of 86 minutes and biked an average of 29 minutes over 5-days; adults in the treatment areas walked an average of 97 minutes and biked an average of 37 minutes. These differences were not statistically significant. This conference presentation will focus on an evaluation of Pre vs. Post behavior which will be completed by January 31, 2014.

### Conclusions

The presentation will draw conclusions related to the three research objectives, focusing on the intervention's effect on PA, controlling for other factors.

### Implications for Practice and Policy

If bicycle boulevards are positively associated with increased PA and active transportation among youth and adults, this may encourage more cities to implement this relatively low-cost infrastructure improvement.

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## **Support / Funding Source**

The Family Activity Study was funded by the Active Living Research program of the Robert Wood Johnson Foundation and the Oregon Transportation Research and Education Consortium (OTREC).



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### **Supporting Complete Streets Policy Implementation through the Development of a Low-Cost Methodology for Evaluating Pedestrian Safety and Prioritizing Interventions**

*Tara Tolford, MURP<sup>1</sup>, John Renne, PhD<sup>1</sup>, Billy Fields, PhD<sup>2</sup>*

*<sup>1</sup>University of New Orleans, <sup>2</sup>Texas State University*

**Focus Area:** Practice/Policy

#### **Background and Purpose**

After years of exceeding national average crash and fatality rates, New Orleans was designated as an FHWA Pedestrian Safety Focus City in 2011 (1), forcing a renewed focus on addressing this troubling and persistent problem. Meanwhile, Complete Streets policies in this area were adopted at the state, regional, and municipal levels between 2010 and 2012 (2), presenting a critical opportunity to encourage and facilitate active transportation through policy implementation. In order to equitably prioritize these investments and maximize benefits to users, implementation of Complete Streets policy needs to be linked to the region's safety deficiencies.

Since 2006, the University of New Orleans (in partnership with the New Orleans Regional Planning Commission) has been engaged in the development of tools for evaluating crash outcomes and improving safety for non-motorized users. The purpose of this study was to synthesize these activities into a flexible, low-cost framework for conducting a comprehensive pedestrian safety analysis, providing decision-makers with the necessary data to effectively link pedestrian safety with the built environment and create pedestrian-friendly neighborhoods, a fundamental component of a Complete Streets approach.

#### **Description**

This effort addresses local and regional agencies' need to evaluate and prioritize pedestrian crash hot spots, and to explore the factors and circumstances associated with those crashes in specific corridors, intersections, or nodes based on readily available or easily obtained data sources. Thus, the following steps were included in this analysis:

1. Identification and Analysis of Crash Clusters (3)
2. Pedestrian sidewalk and intersection audits (4)
3. Pedestrian and bicycle counts (5)
4. Analysis of area demographics, transit, and land use context
5. Narrative profile of fatal and severe crash incidents within target clusters
6. Recommended Interventions

The result of this analysis is a concise summary of identified shortcomings in the pedestrian environment, estimated user demand, and suggested countermeasures to improve safety for a given area. This can be used as a tool to advocate for change, to provide benchmark metrics against which to evaluate future progress, to better understand some of the complexities impacting safety outcomes, and as a tool to facilitate discussion and generate support for needed policy or infrastructure interventions.

#### **Lessons Learned**

As anticipated, this study illuminated numerous infrastructure deficiencies: many facilities need to be retrofitted to comply with the American Disabilities Act, upgrades to outdated and/or non-functional equipment, and solutions needed for long-term maintenance of infrastructure once constructed. Better understanding the conditions present in a specific node, neighborhood, city, or region that affect safety outcomes can help us to more effectively prioritize the use of limited resources for near-term





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interventions, as well as to holistically plan for programs and policies that will guide transportation planning in the long term.

More broadly, this study also revealed a need for systemic changes in how pedestrian accommodation is provided and prioritized, and in how crash data pertaining to non-motorized users is collected, coded, and disseminated. Overall, development of a flexible, low-cost methodology for conducting localized non-motorized safety research advances communities' efforts to improve safety outcomes, address accessibility shortcomings, and implement new and innovative ways to better implement complete streets policies.

### Conclusions and Implications

This framework for evaluating pedestrian safety, prioritizing investment, and tracking change is of potential use to many local and regional agencies, consultants, and researchers. It provides a method to efficiently guide crash analysis and mitigation, particularly in areas where access to data is constrained or non-motorized data collection programs have not yet been institutionalized.

This is especially valuable when policies have been adopted that demand such data in order to be implemented effectively, such as Complete Streets. Analysis techniques such as those described in this research can be used to 1) evaluate pedestrian conditions at the project level and identify recommended improvements, 2) prioritize investments across a jurisdiction in order to ensure that resources are applied where most needed, and 3) measure progress toward policy implementation, capturing changes in key metrics including crash totals and severity, built environment audit scores, and user volumes over time. Jurisdictions with recently adopted complete streets policies should consider incorporating multi-tool analysis frameworks such as this one in order to ensure a coordinated, data-driven approach to policy implementation.

### Next Steps

The results of this study are being presented to various agencies involved in the implementation of New Orleans' Complete Streets policies, and the researchers will continue to work with these agencies to incorporate this analysis framework in policy implementation and evaluation. Additional research is ongoing to develop a complementary analysis framework for bicyclists. Effective Complete Streets policy implementation should include coordination among stakeholders, including government agencies, developers, advocates, engineers and planning professionals, and the local community. This approach to collecting and interpreting data will be used to facilitate dialogue among these stakeholders, and ensure investments in active transportation maximize positive impacts and promote equitable outcomes for communities.

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## **Support / Funding Source**

This study was funded by the New Orleans Regional Planning Commission and Louisiana Department of Transportation and Development.



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### **CicloVía Participation and Impacts in San Diego, CA: The First CicloSDias**

*Jessa Engelberg, BA<sup>1</sup>, Michelle Black, BS, BA<sup>1</sup>, Jordan Carlson, PhD, MA<sup>1</sup>, Sherry Ryan, PhD<sup>2</sup>, James Sallis, PhD<sup>1</sup>, Tracy Delaney, PhD, RD<sup>3</sup>, Mina Brown, ACIP, MA<sup>3</sup>, Ed Clancy, BA<sup>4</sup>*

*<sup>1</sup>University of California, San Diego, <sup>2</sup>San Diego State University, <sup>3</sup>Public Health Alliance of Southern California, <sup>4</sup>City of San Diego Bicycle Initiatives*

**Focus Area:** Research

#### **Background and Purpose**

San Diego held its first Open Streets event called CicloSDias on Sunday August 11th, 2013. This event was modeled after the community-based CicloVía programs which are held internationally. From 10AM to 4PM, streets were temporarily closed to vehicles, allowing exclusive access to cyclists and pedestrians for active recreation. The 5.2 mile route crossed through four diverse neighborhoods in an effort to involve individuals from low socioeconomic status (SES) and ethnically diverse populations.

#### **Objectives**

This study evaluated participation rates and impacts of CicloSDias in four areas: 1) reach and attendance; 2) impacts on attendees' physical activity; 3) impacts on local businesses, 4) support for improved bicycling infrastructure.

#### **Methods**

Attendee counting. Direct observation was used to obtain counts of attendees. Attendees were classified by gender (male vs. female), age (adult vs. child) and activity (biking, pedestrian, or other wheeled device).

Intercept surveys. A brief intercept survey assessed attendees motivation for attending, reach of the event, physical activity during the event as well as a typical week, and attitudes towards bicycling infrastructure. Large posters were used to collect data on four survey questions perceived as most important to expand the sample.

Business survey. To determine the impact on local businesses, a brief survey was distributed at the end of the event to all businesses along the route. The survey questions were intended to capture the impacts of CicloSDias on the business' customers, staff and profits, as well as how supportive business owners were to having another CicloSDias.

Community-wide survey. Two-weeks prior to the event, a city-wide survey was administered via telephone to inquire about their knowledge of CicloSDias and their support for bicycling infrastructure. Random digit dialing was conducted within San Diego City zip codes, with a greater proportion of people living near the event being targeted. Another survey was conducted during the two-week period directly following CicloSDias, using the same methods and a new randomly-selected sample. Similar questions were used so that changes in knowledge of CicloSDias and support for bicycling infrastructure could be investigated.

#### **Results**

Attendance: Approximately 8,311 people participated in the CicloSDias event. The most common modes of travel at the event were cycling, at over 80%, and about 12% walked. The distribution across gender and age was around 53%-54% of cyclists recorded as male and 34%-35% recorded as female. Around 11%-13% of cyclists were children. For more detail, see Table 1.



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Reach of event: Data are currently being analyzed for all other outcomes. The final report will compare characteristics of the attendees to people living in the area around the event as well as across San Diego. It will also document how many people in the community-wide survey had heard about event and how, which will suggest the most effective mode of advertisement and outreach.

Impacts on physical activity: One thousand surveys were collected at the event. The final report will compare minutes of PA during the event to minutes of PA on a typical weekend day. Association between SES and race/ethnicity with self-reported PA impacts will be analyzed.

Impacts on businesses: Business impact survey data (n=30) will be analyzed to determine if businesses were supportive of the event and how their business was impacted. From the intercept surveys, the final study will investigate how many attendees shopped at local businesses.

Supportiveness for bicycling infrastructure: There were 404 community-wide pre-surveys and 405 post-surveys collected, with 174 total being Latino. The final report will compare supportiveness of attendees to supportiveness of respondents to the community-wide survey. Additionally, the pre- and post-community-wide survey data will be compared to assess change in support. Correlates of support for improved bicycling infrastructure will be assessed. A profile of attendees' support for bicycle infrastructure, in terms of basic demographics, zip code, and amount of PA, will be determined to see if bicycling infrastructure varies by specific demographics or

### **Conclusions**

The present evaluation appears to be unique in being a particularly thorough assessment of the first Ciclovía event in a city, which allows for examination of the impact on community support for policies related to bicycle infrastructure. By conducting a thorough assessment of attendees, a population sample, and local businesses, the results can be used to justify and improve similar events in the future.

### **Implications for Practice and Policy**

Open Streets events require substantial planning and costs, so identifying benefits of the events can help justify future events. Each component of the present evaluation provides information of relevant to program planners and policy makers. Participating in CicloSDias or seeing favorable media coverage may increase support for improved bicycle infrastructure. Support from the business community is likely to be critical to acceptance of future events. The community-wide surveys determine the most effective methods of advertisement and distribution of event information and can identify neighborhoods with the most interest in hosting future events.

### **Support / Funding Source**

The California Endowment



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**Table 1**  
**Summary of Participants by Age, Gender and Mode of Travel**  
8-11-2013 San Diego CicloSDias Event

	City Heights	North Park	Southeastern San Diego	AVERAGE
Total 5-Hour Count (All Participants)	4,084 participants	6,926 participants	4,201 participants	5,070 participants
Male	2,121 (52%)	3,612 (52%)	NA	2,867 (57%)
Female	1,400 (34%)	2,523 (36%)	NA	1,962 (39%)
Child	563 (14%)	791 (12%)	NA	677 (14%)
Total 5-Hour Count (Cyclists)	3,749 cyclists	5,620 cyclists	NA	4,685 cyclists
Male	1,983 (53%)	3,017 (54%)	NA	2,500 (53%)
Female	1,275 (34%)	1,966 (35%)	NA	1,620 (35%)
Child	491 (13%)	637 (11%)	NA	564 (12%)
Total 5-Hour Count (Pedestrians)	232 pedestrians	1,237 pedestrians	NA	735 pedestrians
Male	99 (43%)	574 (46%)	NA	337 (45%)
Female	99 (43%)	520 (42%)	NA	310 (42%)
Child	34 (14%)	143 (12%)	NA	89 (13%)
Total 5-Hour Count (Other Travelers)	103 other travelers (2%)	69 other travelers (1%)	NA	86 other travelers
Male	39 (38%)	21 (30%)	NA	30 (35%)
Female	26 (25%)	37 (54%)	NA	32 (37%)
Child	38 (37%)	11 (16%)	NA	25 (29%)



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## **The Practical Implementation and Transferability of 'Walkability' as a Concept: Considerations for Active Living Research**

Lorraine D'Arcy, BE (Civil), MEngSc, PhD<sup>1</sup>, Kevin M. Leyden, BA, MA, PhD<sup>2</sup>, Catherine Woods, BSc, PhD<sup>1</sup>

<sup>1</sup>Dublin City University, <sup>2</sup>National University of Ireland, Galway

**Focus Area:** Research

### **Background and Purpose**

Research translation is needed, especially to 'implementers' to incorporate health in their everyday work (Jackson, Dannenberg, & Frumkin, 2013). These walkability stakeholders, such as planners, engineers, architects, urban designers, policy makers amongst others, have their own professional knowledge on what constitutes a successful urban realm or physical environment. While their opinions may be biased towards their desired outcomes, such as sustainable transport behaviours or engaging streetscapes, their relevant knowledge is not always incorporated into physical activity or public health research in a holistic manner that ensures results are translatable to their practices. The diversity of relevant terms, concepts and practices from professional disciplines can result in misinterpretation or omission because of a supposed irrelevance (Brennan Ramirez et al., 2006). This can reduce the perceived significance of research findings (Allender, Cavill, Parker, & Foster, 2009). This exploratory exercise created a discussion forum for multidisciplinary participants using common reference areas, selected by the participants themselves, within the Greater Dublin Area (Ireland). A holistic walkability criteria checklist, which can be used to address walkability in guidelines, plans, designs and policies, was generated from the study findings. The criteria consider the contextual nature of walkability and how it relates to micro street-level, meso neighbourhood-level or macro city-level environments.

### **Objectives**

The objective of this research was to develop multi-disciplinary, transferable walkability criteria.

### **Methods**

Qualitative data was collected in six professionally heterogeneous focus groups (N=26). The procedure used socio-spatial recall to facilitate discussion on what makes an area high or low walkable. This involved participants selecting two high walkable and two low walkable areas in the inner city, the outer city and suburban areas of Dublin. The area selection process was facilitated using mapping. Area selections were collated and discussed within the group setting. Focus groups were carried out until data saturation was reached. Both the personal and professional concerns of participations were considered as a result of the method used. This contributed to the comprehensiveness of the data obtained. The walkability criteria were generated from the themes identified in the data using content analysis.

### **Results**

Across the focus groups similar areas were selected by participants; however the reasons for selection varied. In general, engineers, public representatives and public health and advocacy professionals selected areas 'to go for a walk' whereas spatial and transport planners and architecture and design professionals selected liveable neighbourhoods. The criteria reflect the contextual nature of walkability and are a series of general statements rather than specific items for measurement. This further increases the transferability and applicability of the criteria. A core theme 'scale' emerged from the data which is consistent with Ewing and colleagues urban design centred walkability research (2006). The remaining 13 criteria relate to (i) the liveable village (n=3), (ii) permeability (n=6) and (iii) the streetscape (n=4).





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### Conclusions

Walkability is contextual and means different things to different people, but also different things to the same person under different contexts. An individual's perception of how walkable an area is forms a key consideration in their decision whether or not to walk regardless of the purpose of the trip. Therefore, walkability should be a key consideration for everyone involved in all elements of the planning, design and construction of the built environment. Therefore, by identifying and summarising the key elements that contribute to walkability, in the opinion of this multidisciplinary group, criteria were developed which are transferable for use in both practice and future research. The key elements are scale, livability, permeability and the streetscape.

### Implications for Practice and Policy

The developed criteria present relevant, multidisciplinary walkability considerations in a succinct manner which will: (i) enable practitioners undertake a simple 'walkability check' on their designs and plans and (ii) inform researchers on the elements of the built environment which are key concerns for practitioners and policymakers.

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### Support / Funding Source

This study was funded by the Irish Environmental Protection Agency and National Development Plan's STRIVE programme.



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### Calculating the Return on Investment of Transportation Demand Management Programs for Physical Activity in Arlington, Virginia

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<sup>1</sup>Simple Solutions Planning & Design,

**Focus Area:** Research

#### Background and Purpose

Active travel has proven health benefits. Walking and bicycling are effective ways to meet the Surgeon General's Guidelines for physical activity with significant results for health. In a study comparing 14 countries, all 50 US states, and 47 of the largest US cities, Pucher et al. (2010) found a strong relationship between active travel, physical activity, and self-reported obesity. In the San Francisco Bay Area, Maizlich et al. (2013) found that increasing median daily walking and bicycling from 4 to 22 minutes reduced the burden of cardiovascular disease and diabetes by 14%.

The transportation demand management (TDM) programs and strategies used by Arlington County Commuter Services (ACCS) promote active travel through BikeArlington and the region-wide bikesharing program, Capital Bikeshare; WalkArlington which strives to get more people walking more of the time; and services to support use of public transit which is also correlated with increased active transportation (Wasfi et al., 2013; Freeland et al., 2012; Lachapelle, 2011). However, limited tools are available to help municipalities calculate the return on their investment in TDM, including walking and bicycling programs and strategies. Such data would be beneficial in discussions about effectively prioritizing limited funding for transportation.

#### Objectives

This study aimed to assess the return on investment of ACCS programs by monetizing the measurable health outcomes of increased physical activity of residents and employees of Arlington County due to these programs. The results will support ACCS in translating the well-accepted linkages between active transportation and healthy living into data for effective program planning and policy.

#### Methods

Two existing tools were applied to the Arlington context to calculate the cost savings of helping 1% of the Arlington County population increase their level of physical activity from 1 minute per week to 150 minutes per week. The World Health Organization (WHO) Health Economic Assessment Tool (HEAT) calculates the savings from reduced mortality due to increased physical activity, specifically walking and bicycling. Changes in the amount of walking or cycling in a given population are converted to economic costs savings using mortality rates, the Value of a Statistical Life (VoSL) and the duration of time over which the benefits are realized (WHO, 2013). The Physical Inactivity Cost Calculator developed by East Carolina University, Department of Health and Promotion (2006), calculates the external benefits of increased physical activity for a population that goes from inactive to 150 minutes a week of moderate exercise (i.e. walking or biking). Cost savings are estimated in three categories - medical care, workers' compensation, and lost productivity.

#### Results

The HEAT demonstrated that if just 1% of physically inactive Arlington adults increase their physical activity to CDC-recommended levels, it could save the country 3.17 deaths per year and result in cost savings of over \$7.5 million per year for the first 5 years. Annual benefits will be even higher for year 6 onwards, once health benefits and update of cycling/walking have reached maximum levels. The PICC showed that if 1% of physically inactive Arlington adults increase their physical activity to CDC-recommended levels, external cost savings in terms of lost productivity, workers' compensation and



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medical care would amount to \$12 million per year. When compared to the FY2013 budget for ACCS of \$10.5 million, the savings provide a 200% rate of return on investment for physical activity benefits alone (Figure 1).

### Conclusions

TDM programs influence travel behavior with implications for the health and safety of individuals and the community. Improved public health and safety is not just a laudable community goal but have an economic value which is a great boon for constrained budgets in both transportation and health sectors. Investments in active transportation have a calculable impact on public health.

### Implications for Practice and Policy

In an effort to develop healthier communities, many municipalities are looking for ways to increase the variety of available transportation choices, particularly walking and bicycling. Calculating the return on investment of active transportation contributes to discussions about prioritizing limited funding for transportation projects by helping identify the full cost and benefit of various modes of transportation. Tools such as the HEAT and the PICC show how an initial investment in transportation provides significant returns in terms of public health and can help municipalities move active transportation from a novel idea to an established program.

The study also helps identify key factors that can improve the accuracy, consistency, and ease of calculating these cost savings in the future, particularly in using the HEAT and the PICC. The Arlington County cost savings calculations were based on available data and reasonable estimates. More accurate data would improve the accuracy of the calculations. In particular, more accurate data is needed on the number of adults that are influenced by ACCS programs to increase their physical activity, on medical costs and insurance claims, workers compensation claims and payments, and on the mortality rate and the VoSL of Arlington County.

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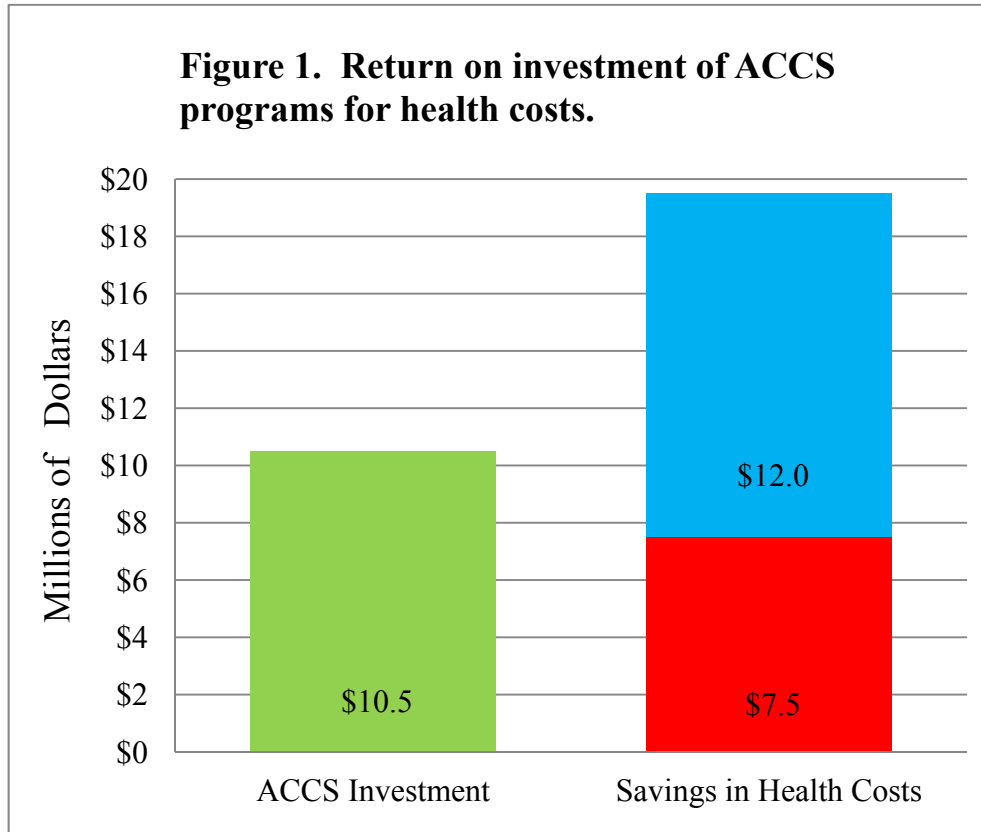
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## Support / Funding Source

Arlington County Commuter Services (ACCS) is the Transportation Demand Management (TDM) agency of Arlington County, Virginia. ACCS was established in 1989 in order to enhance Arlington's economic vitality.





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## Using Ecological Momentary Assessment to Examine Whether Environmental Perceptions Mediate the Effects of Smart Growth Planning on Physical Activity and Obesity

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**Focus Area:** Research

### Background and Purpose

Smart growth urban planning strategies (e.g., preservation of open space, integration of mixed land uses, establishment of compact building design, creation of walkable neighborhoods) may increase physical activity and lower obesity risk. It is thought that smart growth communities offer greater opportunities to be physically active in settings that are safer, have lower traffic exposure, and are more aesthetically pleasing (e.g., greater greenness, vegetation, shade). However, it is unknown whether residents of smart growth communities actually perform physical activity in safer and more aesthetically pleasing settings, and how performing physical activity in safe and aesthetically pleasing settings is related to overall physical activity levels and obesity. This limitation, known as the uncertain geographic context problem (UGCoP), is a growing concern in research on the built environment and physical activity. It is characterized by a lack of clarity about (1) the specific context or setting that has a direct influence on health-related behaviors; and (2) the timing and duration of individuals' actual exposures to these contextual influences. To address these concerns, the present study used a real-time data capture strategy, Ecological Momentary Assessment (EMA), to measure where physical activity occurs and perceptions of those settings.

### Objectives

This study used EMA with electronic surveys delivered through mobile phones to determine whether perceived safety, traffic, and aesthetics of settings, where physically activity actually occurred, mediate the effects of living in a smart growth community on physical activity, body mass index (BMI), and waist circumference in adults.

### Methods

Research used a two-group quasi-experimental ("natural experiment") design. Participants included 58 adults who had recently moved to a smart growth community in Southern California and a demographically-matched set of 59 adults living in nearby urban-sprawling comparison communities. The groups were comparable in age ( $M = 40.7$  years,  $SD = 9.6$ ), gender, (72% female), ethnicity (31% Hispanic), and income (27% < \$40,000/yr). Individuals participated in eight days of EMA via mobile phones, with eight random EMA surveys per day between 6:30am and 10:00pm. EMA items measured current activity (e.g., eating, watching TV, physical activity/sports), physical context (e.g., home [indoors], home [outdoors], outdoors [not at home], work), and perceptions of that context if outdoors (i.e., safety, traffic, greenness/vegetation, shade, litter). Adults wore an Actigraph GT2M accelerometer to assess daily moderate-to-vigorous physical activity (MVPA). Height, weight and waist circumference were measured by research staff. Person-level average scores for perceived safety, traffic, greenness/vegetation, shade, and litter were calculated across EMA prompts when physical activity was reported in outdoor contexts. Direct and indirect effects of living in a smart growth community on perceptions of physical activity contexts, MVPA, BMI, and waist circumference were tested using linear regressions and bootstrapping in the SOBEL macro for SPSS.

### Results

Residents of the smart growth community reported greater safety in outdoor physical activity settings than the comparison group ( $\beta = .38$ ,  $p = .017$ ). Also, greater perceived safety of outdoor physical activity settings was negatively associated with lower BMI ( $\beta = -.266$ ,  $p = .050$ ) and waist circumference ( $\beta = -$



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.298,  $p = .033$ ), and positively related to daily MVPA ( $\beta = .239$ ,  $p = .079$ ). The indirect effect of living in a smart growth community (through perceived safety of physical activity settings) was statistically significant for waist circumference (estimate = -3.39, 95% CI = -6.89 to -0.48) but not for BMI or MVPA. Perceptions of greenness, shade, traffic, and litter did not differ between individuals living in the smart growth versus control communities ( $p$ 's > .05). However, greater perceived greenness of outdoor physical activity contexts was associated with lower BMI ( $\beta = -.297$ ,  $p = .028$ ), and greater perceived shade protection of outdoor physical activity contexts was associated with higher daily MVPA ( $\beta = .274$ ,  $p = .043$ ) regardless of group.

### **Conclusions**

Using a novel, real-time data collection strategy, this study found that greater perceived safety of physically activity settings may partially account for lower waist circumference among smart growth residents as compared with individuals living in urban sprawling comparison communities. Results suggest that smart growth planning may not influence perceived greenness, shade, traffic, and litter of outdoor physical activity contexts. However, these findings need to be replicated in other smart growth communities. Among all participants, regardless of community residency, those who performed physical activity in contexts with greater perceived shade from the sun were more physically active overall. Also, individuals who performed physical activity in contexts with greater perceived greenness had lower BMI's on average. These findings suggest that performing activity in outdoor settings with specific features such as greater shade, greenness, and safety may offer conditions that promote more sustained, intense and/or frequent activity and lower obesity risk.

### **Implications for Practice and Policy**

Designing communities according to smart growth urban planning principles may create subjectively safer places to be physically active, leading to lower obesity risk.

### **Support / Funding Source**

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## **Salud America!: Using Research and an Evidence-based Policy Contribution Model to Create an Online Platform for Healthier Changes in Latino Communities**

*Rosalie Aguilar, MS<sup>1</sup>, Amelie Ramirez, DrPH, MPH<sup>1</sup>, Rebecca Adeigbe, MS<sup>1</sup>, Cliff Despres, BJ<sup>1</sup>, Kipling Gallion, MA<sup>1</sup>*

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**Focus Area:** Research

### **Background and Purpose**

More than 39% of Latino children ages 2-19 are overweight or obese, compared to almost 32% of all U.S. children.(1) These high rates of obesity among Latino children are particularly alarming because Latino children currently comprise 22% of all U.S. youth—and are expected to grow to comprise 30% of the youth population by 2025.(2-3)

In response, Salud America! The Robert Wood Johnson Foundation (RWJF) Research Network to Prevent Obesity Among Latino Children launched an online network in 2007 to mobilize four sectors of society (community leaders, researchers, policymakers and media) to collaborate to reverse the obesity epidemic. In its first five years, the network recruited more than 2,000 members and fed them with innovative video, online and e-communications.(4-5)

The network also made many research advancements:

1. Developed the first-ever Latino Childhood Obesity Research Priority Agenda;
2. Funded 20 grantee researchers;
3. Developed research briefs on Latino nutrition, physical activity and media/marketing issues;
4. Developed the “Policy Contribution Spectrum” model.(6-7)

Based on its research success and the Spectrum model, Salud America! has created and is beta-testing a unique online platform that will expand its membership and activate them to create healthy lifestyle policy change to prevent and reduce Latino childhood obesity in the areas of: active play, active spaces, better food in the neighborhood, healthier school snacks, healthier marketing, and sugary drinks.

### **Objectives**

Salud America! is creating, populating, and recruiting members for a multi-purpose online platform, Growing Healthy Change, to serve as a clearinghouse for news, research and evidence-based informational products, ongoing prevention policies, dynamic role model stories and videos, and other resources to prevent Latino childhood obesity.

We hypothesize that this online platform, which will be launched following beta-testing in Fall 2013, will increase self and collective efficacy among members of the Salud America! network to drive community efforts that will lead to reductions in Latino childhood obesity.

### **Methods**

Salud America! surveyed its network in January 2013 to gauge the use of Salud America! products—including monthly E-alerts, quarterly E-newsletters, a website, and the proposed Growing Healthy Change online platform—and determined network members’ baseline perceived self and collective efficacy for childhood obesity change. A total of 148 individuals responded, about 10% of the network. Most respondents were between ages 50-59 (30%) and female (80%). More than half of respondents were Latino (65%).



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### Results

Survey results found that the majority of respondents read our quarterly and monthly newsletters and a good proportion of our younger network members were connected and using our social media fed content. In regards to efficacy for advocacy, higher levels of Salud America! engagement was associated with collective efficacy—greater confidence in organized group advocacy as a way of advancing policies to reduce Latino child obesity. This sense of collective efficacy moderately predicts intentions to engage in advocacy behaviors. Salud America! engagement levels were less strongly associated with members' confidence in their personal ability to be an effective advocate, and this sense of self-efficacy was a very strong predictor of intentions.

Based on these findings, the Growing Healthy Change online platform will work toward increasing self- and collective efficacy through peer modeling—framed through the network's evidence-based Policy Contribution Spectrum—and tools to help individuals interested in promoting change to connect with each other and with opportunities for concerted local actions in their communities.

### Conclusions

Based on network feedback, Salud America! is working to expand its web-based network through improved and more frequent communication and through the development of the Growing Healthy Change online platform—a website which will allow users to stay informed about the latest in policies related to Latino childhood obesity.

Visitors to the site will be able to browse through policy changes occurring at the national, state, and local level as well as success stories, resources, and multimedia products. By becoming a registered user, visitors will be able to submit their own success stories, stories of change happening in their community, and will be able to connect with others who are also a part of the Salud America! network.

After the launch of the “Growing Healthy Change Platform,” quarterly network surveys will be sent out to evaluate the use of our Salud America! products, platform and impact on self and collective efficacy.

### Implications for Practice and Policy

1. With research and multimedia products highlighting six areas of potential change—including active play and active spaces—Salud America! will continue to lead health communication efforts to reverse childhood obesity among Latinos.
2. The Growing Healthy Change online platform will serve as an innovative learning and communications tool to drive change and reverse Latino childhood obesity.
3. The platform will also track changes occurring at all levels and will help determine which communities lack policies to enforce healthier lifestyles and active living initiatives, and educate on how to make changes in those areas.

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### **Support / Funding Source**

This research project is funded by the Robert Wood Johnson Foundation (ID 70208).



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## **Correlates of State Adoption of Elementary School Physical Education Policies**

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**Focus Area:** Research

### **Background and Purpose**

Physical education (PE) is a key evidence-based strategy for providing and promoting physical activity, reducing childhood obesity, and improving academic performance, yet the majority of American children do not receive the recommended weekly minutes, and standards for PE curricula, teacher certification, and student fitness assessment vary tremendously across states. In 2003, the National Cancer Institute began collecting and scoring state-level codified laws for PE in schools. These data provide a unique opportunity for researchers to examine differences and changes over time across all 50 states and Washington, DC. While previous researchers have used these data to examine associations between state-level policies and actual amount of time allocated to PE, to date, no research has attempted to predict state-level adoption of PE policies. Understanding what motivates or prohibits states from adopting PE laws is important for children's health, especially in our current 'new federalist' political context wherein public health decision-making is increasingly devolved from the federal to the state level.

### **Objectives**

This study aimed to describe variation in states' adoption of elementary school PE policies, with a particular focus on the roles of demographic, economic, political, and academic achievement characteristics in explaining state policy adoption in relation to PE time, curriculum standards, teacher certification, and fitness assessment requirements.

### **Methods**

We used data from the 2003-2010 National Cancer Institute's Classification of Laws Associated with School Students (C.L.A.S.S.) merged with state-level data from the US Census, National Center for Education Statistics, and Annie E. Casey Foundation to determine significant predictors of state adoption of PE time, fitness assessment, staffing, and curriculum policies for elementary schools. Potential state-level predictor variables (see Table 1) included socioeconomic, demographic, political, education system, and academic achievement characteristics. Pearson correlation coefficients and multivariate regression analyses were used to examine associations.

### **Results**

We found tremendous variation in PE requirements across states. As of 2010, only 4 states (Florida, Louisiana, Mississippi, and Oregon) required elementary schools to provide at least 150 minutes of PE per week, and the majority of states (63%) required less than 60 minutes. In addition, the majority of states (61%) had no fitness assessment requirement/recommendation. PE curriculum standards and staffing requirements were more common; over half of states require newly-hired PE teachers to have certification, licensure, or endorsement and a college minor or major in PE. In addition, over half of states require that PE address students' PA knowledge, behavioral and motor skills and/or fitness, and over half of states reference and incorporate curriculum standards from NASPE, a specific state agency, or another organization. Interestingly, states with more vulnerable populations (e.g. higher percent poverty, higher percentage of students eligible for free/reduced lunch, higher percentage of single mother households, lower median household income, higher percentage of black students, and higher percent black population) were more likely to have adopted stronger PE time requirements and to have incorporated curriculum standards from NASPE, a specific state agency, or another organization than states with more secure populations. With the exception of being negatively related to stronger PE staffing requirements, state-level political characteristics were not associated with the adoption of any PE



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laws that we examined. Finally, student academic achievement was inversely related to both PE time requirements, the incorporation of specific curriculum standards, and fitness assessment requirements. Specifically, states with a higher percentage of 4th graders scoring below the proficient level in math were more likely to have stronger PE time requirements, 4th grade math and reading scores were negatively associated with the incorporation of specific PE curriculum standards, state-level improvement in 4th grade math scores from 2003 to 2009 was negatively associated with PE time requirements, and improvement in both 4th grade math and reading scores was negatively associated with PE fitness assessment requirements.

### Conclusions

States with vulnerable populations are more likely than those with economically stable populations to adopt stronger PE time and staffing requirements and to incorporate curriculum standards from NASPE, a specific state agency, or another organization. The adoption of such laws is also inversely associated with student academic performance and improvement in performance over time, suggesting a potential trade-off at the state level between investment in PE requirements and investment in student academic achievement. The results of this research suggest that more affluent states may be valuing and investing in academic achievement over PE.

### Implications for Practice and Policy

This study highlights tremendous variation in state's adoption of elementary school requirements related to PE time, staffing, curriculum, and student fitness assessment. This and other studies illustrate that time, funding, and co-existing priorities are perceived barriers to investment in PE. It may be that as a prelude to PE policy adoption, evidence illustrating how PE policies can be accomplished within the existing time and funding structures will be needed. To this end, studies that examine modifiable aspects of the structural delivery of PE (e.g. scheduled time, instructional delivery and curriculum models) are needed.

Table 1. Pearson Correlation Coefficients for Relationship between State-Level Characteristics and State-Level PE Laws

	PE time requirement	Fitness assessment requirement	PE staffing requirements	PE curriculum standards	State uses curriculum standards from NASPE, state agency, or other org.
<b>Socioeconomic</b>					
Unemployment Rate	.216	.023	.162	-.124	.066
Pct. Eligible for free or reduced meals	<b>.406</b>	.145	.200	.199	<b>.542</b>



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Pct. Poverty	<b>.449</b>	.259	.007	.122	<b>.374</b>
Pct. Child poverty	<b>.436</b>	.236	.071	.132	<b>.407</b>
Median household income	<b>-.337</b>	-.213	.119	-.220	-.112
Pct. Single mother households	<b>.359</b>	.072	<b>.348</b>	.136	<b>.471</b>

### Demographic

Pct. White students	-.108	.050	<b>-.314</b>	.148	<b>-.374</b>
Pct. Black students	<b>.282</b>	-.112	<b>.347</b>	.058	<b>.472</b>
Pct. Asian students	-.219	-.137	.016	-.272	-.109
Pct. American Indian students	-.228	.003	-.173	.179	.032
Pct. Hispanic students	.124	.170	.166	-.133	.127
Pct. Black population	<b>.295</b>	-.105	<b>.356</b>	.060	<b>.492</b>
Pct. Hispanic population	.129	.208	.167	-.126	.163
Pct. Pop under 5 years old	-.071	.160	-.271	.064	.159
Pct. Pop 65 and over	.179	-.104	.049	-.010	-.207

### Political

Republican controlled state Senate	-.073	.152	<b>-.286</b>	.047	.023
Republican controlled state House of Representatives	.085	.143	-.201	-.009	.188
Republican citizen ideology (McCain carried vote in 2008)	.155	.258	<b>-.359</b>	.130	<b>.342</b>
Republican governor	.051	.027	.002	-.048	.060

### Education-System

Total number of students	<b>.355</b>	.249	.150	-.117	.229
Total revenue per pupil	-.190	-.009	.228	.015	.031
State revenue per pupil	-.238	.220	.001	-.119	-.078
Pct. change in state education funding, 2002-2010	-.109	.072	-.086	.063	.068
Pct. of revenue coming from state	-.132	.251	-.191	-.229	-.060
Pupil-to-teacher ratio	.080	.085	-.196	-.173	-.102
Pct. Change in pupil-to-teacher ratio, 2002-2010	-.117	.088	.054	-.118	-.143
Expenditures per pupil	-.190	.078	.137	.133	-.010
4th grade average math score, 2009	-.231	-.169	-.045	-.042	<b>-.484</b>
4th grade average reading score, 2009	-.163	-.204	-.012	-.066	<b>-.295</b>
Pct. Improvement in 4 <sup>th</sup> grade math scores, 2003-2009	<b>-.340</b>	<b>-.283</b>	.137	.193	.232
Pct. Improvement in 4 <sup>th</sup> grade reading scores, 2003-2009	.022	<b>-.274</b>	.119	-.048	.124
Pct. of 4th grade math scores below the basic level, 2009	.169	.140	.069	.007	<b>.429</b>
Pct. of 4th grade math scores below the proficient level, 2009	<b>.303</b>	.200	.047	.082	<b>.531</b>
Pct. of 4th grade reading scores below the basic level, 2009	.175	.184	.091	.066	<b>.311</b>
Pct. of 4th grade reading scores below the proficient level, 2009	.238	.107	.072	.063	.210





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Pct. of children overweight/obese, 2003	<b>.315</b>	.204	.156	.125	<b>.555</b>
Pct. of children overweight/obese, 2007	.271	.164	.158	.187	<b>.577</b>

*Note:* Bolded values significant at  $p < .05$  or better; two-tailed tests;  $N=51$

*PE Time Requirement:* 0=No PE time requirement or recommendation; 1=State only recommends a PE time requirement for public school districts; or state requirement for physical activity includes an option for PE; 2=State requires public school districts to provide PE for less than 60 minutes per week or state requires PE without a specified time requirement; 3=State requires public school districts to provide PE for a minimum of 60 minutes per week but less than 90 minutes per week; 4=State requires public school districts to provide PE for a minimum of 90 minutes per week but less than 150 minutes per week; 5=State requires public school districts to provide PE for a minimum of 150 minutes per week.

*Fitness Assessment Requirement:* 0=No state requirement or recommendation for health-related fitness assessment; 1=State only recommends health-related fitness testing; 2=State requires public school districts to have students participate in a standardized health-related fitness test at least once in ES, with or without specified fitness test components; 3=State requires public school districts to have students participate in a biennial standardized fitness test that addresses cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition; 4=State requires public school districts to have students participate in an annual (or more frequent) standardized fitness test that addresses cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition

*Staffing Requirement:* 0=No requirement of recommendation for PE teachers; 1=State only recommends certification/licensure/endorsement) and an academic degree in PE to teach PE; 2=State offers certification/licensure/endorsement to teach PE and requires newly-hired PE teachers to have certification/licensure/endorsement and preparation that is less rigorous than a college minor (e.g. less than 15 credit hours) in PE; 3= State offers certification/licensure/endorsement to teach PE and requires newly-hired PE teachers to have certification/licensure/endorsement and a college minor (or minimum of 15 credit hours) in PE; 4= State offers certification/licensure/endorsement to teach PE and requires newly-hired PE teachers to have certification/licensure/endorsement and a college major (or a minimum of 30 credit hours) in PE

*Curriculum Standards:* 0=No requirement or recommendation for PE curriculum; 1=State only recommends curriculum standards/guidelines for PE; 2=State standards are required, but by reference to a curriculum framework only, but curriculum framework is not fully incorporated into codified law; 3=State standards are required for PE that address student knowledge of physical activity, behavioral and motor skills, or health-related fitness, but not all such components; 4= State standards are required for PE that address student knowledge of physical activity, behavioral and motor skills, and health-related fitness, or state requires ES to meet national standards that include such components.

Table 2. Odds Ratios for Regression Models Predicting State Adoption of PE Policies

	PE time requirements <sup>a</sup>	PE staffing requirements <sup>a</sup>	State uses curriculum standards from NASPE, state agency, or other org <sup>b</sup>
<b>Socioeconomic</b>			
Pct. Eligible for free or reduced meals	1.094 (1.032--1.161)	ns	1.174 (1.067--1.293)
Pct. Poverty	1.409 (1.140--1.741)	ns	1.318 (1.064--1.632)



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Pct. Child poverty	1.221 (1.076-- 1.384)	ns	1.205 (1.053-- 1.378)
Median household income (\$1,000s)	0.913 (0.846-- 0.986)	ns	ns
Pct. Single mother households	2.237 (1.254-- 3.993)	1.861 (1.090-- 3.175)	3.408 (1.538-- 7.550)

## Demographic

Pct. White students	ns	0.970 (0.944-- 0.997)	0.956 (0.923-- 0.990)
Pct. Black students	1.039 (1.002- 1.078)	1.053 (1.010-- 1.098)	1.118 (1.039-- 1.204)
Pct. Black population	1.058 (1.006- 1.113)	1.075 (1.017-- 1.136)	1.166 (1.054-- 1.289)

## Political

PeRepublican controlled state Senate	ns	0.340 (0.118-- 0.979)	ns
Republican controlled state House of Representatives	ns	ns	ns
Republican citizen ideology (McCain carried vote in 2008)	ns	0.292 (0.100-- 0.853)	4.318 (1.296-- 14.383)
Republican governor	ns	ns	ns

## Education-System

Total number of students (logged)	1.902 (1.083-- 3.338)	ns	ns
Total revenue per pupil	ns	ns	ns
State revenue per pupil	ns	ns	ns
Pct. of revenue coming from state	ns	ns	ns
Pupil-to-teacher ratio	ns	ns	ns
Expenditures per pupil	ns	ns	ns
4th grade average math score, 2009	ns	ns	0.803 (0.696-- 0.926)
4th grade average reading score, 2009	ns	ns	0.906 (0.823-- 0.997)
Pct. Improvement in 4th grade math scores, 2003-2009	0.510 (0.288-- 0.903)	ns	ns
Pct. Improvement in 4th grade reading scores, 2003-2009	ns	ns	ns
Pct. of 4th grade math scores below the basic level, 2009	ns	ns	1.195 (1.054-- 1.355)
Pct. of 4th grade math scores below the proficient level, 2009	1.079 (1.008- 1.154)	ns	1.211 (1.075-- 1.364)
Pct. of 4th grade reading scores below the basic level, 2009	ns	ns	1.100 (1.007- 1.202)
Pct. of 4th grade reading scores below the proficient level, 2009	ns	ns	ns



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Pct. of children overweight/obese, 2003	1.169 (1.018- 1.344)	ns	1.475 (1.174-- 1.854)
Pct. of children overweight/obese, 2007	ns	ns	1.571 (1.215-- 2.031)

*Notes:* Odds ratios and 95% confidence intervals reported only for significant relationships. All reported relationships are significant at the  $p < .05$  level or better.

<sup>a</sup> Ordinal logistic regression models predict odds of adopting stronger requirements

<sup>b</sup> Binary logistic regression models predict odds of using specific curriculum standards



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## Measuring and Improving Student Fitness Statewide

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**Focus Area:** Practice/Policy

### Background and Purpose

In 2011, the Kansas Department of Health and Environment (KDHE) and the Kansas State Department of Education (KSDE), with funding from the Kansas Health Foundation, began a statewide initiative to track and improve fitness in Kansas schools. Two main projects were implemented across the state: (1) the Kansas Fitness Information Tracking (K-FIT) system that links fitness measures and academic performance of students in grades 4-12 and (2) Let's Move in Kansas Schools (LMIKS) that trains physical educators on the Comprehensive School Physical Activity Program (CSPAP).

The initial step of K-FIT was configuring the new online version of FitnessGram® (FG) to work with KSDE's Kansas Individual Data on Students system to allow individual student fitness data to be linked to individual academic indicators. FG is a computer program that records and tracks student fitness test results. Teachers are trained on FG and specific testing protocols to ensure reliability. The tests measure aerobic capacity, body composition, muscular strength, muscular endurance and flexibility.

LMIKS involved training Kansas physical educators on the Let's Move in School (LMIS) program developed by the National Association for Sport and Physical Education. This initiative is based on research that links increased student fitness levels and opportunities for physical activity with greater academic success and improved health.

### Description

Kansas was one of the first states to develop a system to link student fitness data with academic indicators at the state level and to offer large-scale trainings on the CSPAP model. Kansas has worked to create a culture of physical activity inside and outside of PE classes. The CSPAP evidence-based model takes a whole school approach and emphasizes five components: physical education, physical activity during school, physical activity before and after school, family and community involvement, and staff involvement.

Trainings directed toward physical education teachers both on FG and CSPAP are designed to provide teachers the tools to work with and train school staff on incorporating physical activity throughout the day while tracking and improving student fitness during PE. Teachers can assist students in setting goals for improvement. This approach emphasizes a multi-faceted view of fitness, expanding beyond a reliance on BMI.

To date, 18 Kansas physical educators have become national trainers on LMIS and more than 200 Kansas physical education teachers have been trained on the CSPAP model. These educators represent more than 70 school districts, 165 K-12 schools, 10 universities and 40 counties.

Through K-FIT, more than 1,000 physical educators from more than 600 schools have been trained on FG. During the 2011-12 school year, fitness data that met the inclusion criteria for analysis was entered on nearly 13,500 students. For the 2012-13 school year, more than twice as many schools entered student fitness data. Correlations between academic performance, fitness and demographics will be presented.



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### Lessons Learned

State Health and Education agencies should factor in sufficient time to develop data sharing agreements to ensure the highest degree of confidentiality and student data protection. Technical difficulties, teacher turnover and providing training for remote portions of the state are ongoing challenges.

The development of Kansas-specific LMIS trainers made it possible to provide training to a large number of physical educators across the state. New LMIKS trainees feel a connection with and trust of the trainers since a majority of them are practicing physical education teachers. Responses from the post-training evaluations and interviews indicate a high level of satisfaction. These results will be presented.

### Conclusions and Implications

The state-level implementation of K-FIT and LMIKS was effective in creating a foundation of qualified, trained physical educators and establishing a baseline of data. The ability to track fitness data at the state and local level will ensure that the progress toward increasing physical activity of students is sustained and will enable evaluation of changes in policies and practices within schools, school districts and statewide. By incorporating components of CSPAP around the school day, students are given opportunities to be more active and classroom teachers and school administrators better understand the link between fitness and academic success.

### Next Steps

In November 2013, LMIKS trainers will have the opportunity to train on the revised Let's Move! Active Schools curriculum. This revised curriculum will expand the target audience to include building-level administrators (i.e. principals), classroom teachers and other school staff to address the main barriers identified, namely lack of buy-in and limited time. Additionally, a renewed focus and emphasis will be placed on working with university faculty to incorporate the CSPAP model and K-FIT training into pre-service teacher preparation curricula. This will enable new physical education teachers to implement K-FIT and CSPAP concepts when they first enter schools.

Kansas received enhanced funding from CDC that will enable the state to provide grants to schools to focus on expansion of school policies and practices to ensure students have many opportunities for quality physical activity before, during and after school.

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3. Bass, R. et al. Physical Fitness and academic performance in middle school students. *Acta Paediatrica.* 2013; 102: 832-837.
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### Support / Funding Source

These projects were funded by the Kansas Health Foundation and coordinated through the Healthy Kansas Schools program. Healthy Kansas Schools is a partnership between the Kansas State Department of Education and the Kansas Department of Health and Environment.



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## **Evaluating the effectiveness of providing coaching and technical assistance during implementation of a new school physical education (PE) law in RI**

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**Focus Area:** Research

### **Background and Purpose**

Given the central role of physical activity (PA) in the prevention of obesity and the current high prevalence rates of childhood obesity, there is an urgent need for the effective implementation of policy, program and environmental supports to help children be more physically active. Schools are an important setting for this. The focus of this study is the implementation of a new RI law that specifies both the quantity and quality of physical education (PE) offered to RI students.

In 2008, Rhode Island passed General Law 16-22-4, mandating the amount (100 minutes/week) and type (i.e. focus on health-related fitness rather than sports/competition) of physical education (PE) to be offered to school students. RI schools were supposed to be in compliance with Law by 2012 but few were. Experience with RI school nutrition regulations suggests that providing training and technical assistance to schools prior to implementing new state-wide regulations results in better outcomes. A similar approach could be helpful for physical activity.

To evaluate the effectiveness of providing training and technical assistance to RI schools to improve compliance with a new law (RI General Law 16-22-4), which mandates the amount (100 minutes/week) and type of PE (i.e. focus on developing and maintaining health-related fitness, rather than on sports/competition).

### **Objectives**

The overall goal of this study is to evaluate whether the two schools that receive coaching, training and technical assistance in their final year of implementing RI's new PE Law have better PA outcomes than two matched control schools that receive no coaching, training or technical assistance.

#### **Specific Aim 1:**

Evaluate whether the intervention schools' teachers, administrators, students and school improvement teams have greater increases in knowledge, skills, enthusiasm, motivation and support for the new PE law than their counterparts in the control schools;

#### **Specific Aim 2:**

Evaluate whether the intervention schools have a greater increase in compliance with the new PE law than the control schools;

#### **Specific Aim 3:**

Evaluate whether students attending the intervention schools have greater increases in PA levels (during school) than students in the control schools.

### **Methods**

Four low-income, elementary schools in two RI cities were recruited and demographically matched. Baseline measures were conducted in Fall/Winter 2011-12 and follow-up data was collected in Fall/Winter 2012-13 with school staff and 220, 3rd and 4th grade students and included:

1. Accelerometer measurement of students' PA on the days of PE class over a 2-week period





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2. Observations of the quality and quantity of PA during PE classes for 2 weeks using the System for Observing Fitness Instruction (SOFIT) tool;
3. Pre-post student surveys regarding behaviors, perspectives and PA and PE practices;
4. Pre-post focus groups with students
5. Pre-post key informant interviews with principals, PE teachers, classroom teachers and parents

### Intervention:

Training and technical assistance was provided to the 2 intervention schools' PE teachers by an 'expert' PE coach/teacher between March and June and in Sept and Oct of 2012.

### Results

- 1) RI elementary schools fall short of state legislation guidelines for amount and type of PE. At both baseline and follow-up, none of the schools met the RI-law mandated 100 minutes per week of PE.
- 2) The average # of weekly minutes spent in PE class was 72.
- 3) Baseline PA levels did not differ by school.
- 4) Baseline SOFIT data showed that 79% of time spent in PE class was non-moderate/vigorous PA (MVPA)
- 5) Baseline accelerometer data showed that 76% of time in PE class was spent in non-moderate/vigorous PA (MVPA) and only 24% of PE class time was spent in moderate-vigorous PA (MVPA).
- 6) At follow-up, accelerometer data showed that intervention school students had statistically significant higher levels of MVPA during PE class; however overall levels were still low.
- 7) One of the biggest issues was that teachers spent too much time talking and instructing children and the children were inactive during these times.
- 8) The number of minutes of PE did not change over time.

More results will be presented on pre-post student survey data, SOFIT data and qualitative data from the key informant interviews and focus groups.

### Conclusions

Students in the intervention schools (where PE teachers received training and technical assistance) demonstrated a significantly larger increase in MVPA during the school day than students in control schools where PE teachers received no training. However, overall rates of PA in PE class were still low. We will discuss the challenges encountered and the implications of these findings.

### Implications for Practice and Policy

Many states, cities and towns are in the process of, and/or considering, changing laws governing PE in schools to increase students' PA levels. In order to obtain the desired results from these laws, they should consider including funding for, and/or mandating, PE teacher training and technical assistance prior to the final policy implementation date to provide them with the necessary knowledge, skills and resources to make effective changes in their teaching methods and practices so that policy changes can be more effective.

### Support / Funding Source

Robert Wood Johnson Foundation Active Living Research.



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### Physical Education Course Substitutions: Are They Comparable?

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**Focus Area:** Research

#### Background and Purpose

Though physical education (PE) is a key evidence-based strategy for providing and promoting physical activity, there are many practice and policy challenges that interfere with it reaching its full potential to impact health outcomes. Among these challenges is the pervasive practice of allowing alternative programs such as Junior Officer Reserve Corps (JROTC) to substitute for PE enrollment. How closely these alternative programs reach the outcomes of PE, including the provision or promotion of physical activity remains unclear. Given the critical need for the accrual of moderate to vigorous physical activity and the importance of PE in promoting it, substitution policies for PE classes should be based on evidence-- yet none exists. Hence, the purpose of this study was to initiate a line of research aimed at building an evidence base on physical activity levels and lesson contexts to assess comparability of high school PE and the courses/programs commonly substituted for it.

#### Objectives

This study aimed to compare student physical activity levels and lesson contexts during high school PE and JROTC, a common PE course substitution.

#### Methods

We identified 12 high schools from a large southwestern urban school district that provided both PE and JROTC. From these, we randomly selected 4 schools to participate in the study. Within each school we recruited 2 PE and 2 JROTC teachers to participate by allowing us to observe one of their randomly selected intact class of students on typical school days during one week. Two trained observers used the System for Observing Fitness Instruction Time (SOFIT) to collect physical activity and lesson context data during 38 PE and 38 JROTC lessons. IOA was conducted on 10% of PE lessons and 25% of JROTC lessons and was found to be 93% for physical activity and 99% for lesson context in PE and 96% for both physical activity and lesson context for JROTC. Two-tailed t-tests were used to examine PE and JROTC differences in the percentage of class time spent in physical activity and lesson context categories. Given that some outcomes were not normally distributed, negative binomial models were used to analyze the rate (incidence density ratio) of student physical activity and lesson context variables. Binary logistic regression models were used to analyze the difference between PE and JROTC classes in odds of providing at least 50% of time in moderate to vigorous physical activity.

#### Results

Students engaged in significantly more moderate to vigorous physical activity during PE lessons than JROTC lessons (61 vs. 23%;  $t=8.64$ ;  $p<.001$ ). Students in PE spent significantly more time walking and engaging in vigorous activities while those in JROTC spent significantly more time sitting and standing. Significantly more PE lessons engaged students in at least 50% of class time in moderate to vigorous physical activity (76 vs. 8%;  $t=8.27$ ;  $p<.001$ ). PE teachers allocated significantly more class time for fitness and game play and teachers of JROTC lessons allocated significantly more time for knowledge and skill development. Knowledge time during PE (100%) focused on physical fitness, motor skill development, and game strategy concepts, while most knowledge time (83%) in JROTC focused on drill, inspections, and military history and strategies. Results of negative binomial models showed that PE lessons provided moderate to vigorous physical activity at a rate almost three times higher than JROTC lessons ( $p<.001$ ) while sedentary behavior time in PE was almost half that of JROTC ( $p<.001$ ). Results of binary logistic regression models indicated that compared with JROTC lessons, PE lessons had



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significantly greater odds of meeting the recommendation of students spending at least 50% of class time in moderate to vigorous physical activity (OR=37.59;  $p < .001$ ; 95% CI: 9.31-151.86).

### **Conclusions**

Students enrolled in JROTC engaged in significantly less moderate and vigorous physical activity than students in PE and they were significantly more sedentary. JROTC provided students “physical training” only one day per week and on other days lessons were delivered in the classroom. Lesson context data also indicated contrasting subject matter delivery. Overall, we found no compelling similarities between PE and JROTC during the observed lessons and therefore failed to find evidence to substantiate the substitution of JROTC classes for PE.

### **Implications for Practice and Policy**

This study highlighted that education policy makers may need to re-evaluate the process for approving course substitutions for required PE. At the very least, prior to being accepted as a substitute for PE, programs should be evaluated for their ability to provide and promote physical activity.