



## POSTER SESSION ABSTRACTS

### 1) Multi-Level Action for Increasing Walking and Bicycling Among Low-Income, Ethnic Minority Elementary School Children

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#### **Background:**

Walking and bicycling to and from school positively impact childhood physical activity and obesity. However, safety concerns prevail; nationally, Hawaii ranks first in pedestrian and third in bicycle fatalities. Many communities lack sidewalks, adequate crosswalks, and bicycle facilities. Also, 70% of Hawaii's school-children are insufficiently active and 30% are overweight/obese. However, Hawaii recently initiated statewide policies for Complete Streets and Safe Routes to School (SRTS) programs, and statewide bicycle and pedestrian plans. Other states have seen positive improvements in pedestrian and bicyclist safety and physical activity by targeting changes in statewide policy, institutions, and individual behavior. The social ecological model supports the notion that changes at multiple levels will be most effective for realizing individual behavioral changes. In this context, People's Advocacy for Trails Hawaii (an advocacy organization), the University of Hawaii, and the County of Hawaii Planning Department developed a joint, rapid response project: Hawaii's Opportunity for Active Living Advancement (HO'ALA).

#### **Objectives:**

The purpose of this abstract is to apply the social ecological framework to the HO'ALA project in working across multiple levels and acting as a feedback conduit for the policies, plans, and programs being used to increase walking and bicycling to and from school.

#### **Methods:**

This one-year quasi-experimental study consisted of 8 intervention and 5 comparison schools across Hawaii County. By following **individual changes** in students' commuting behavior and parent's concerns on walking and bicycling to school; **institutional changes** with SRTS programs; physical infrastructure changes in **communities** around schools; and **policy changes** with Complete Streets and SRTS policies, and statewide bicycle and pedestrian plans, the necessary data are provided for a comprehensive analysis of influential variables related to rates of children walking and bicycling to and from school. The HO'ALA project acts in a participatory role by providing catered evaluation materials to study schools, assisting intervention schools in forming SRTS programs, participating in policy and planning meetings, collaborating with governmental agencies, and creating a direct feedback loop between various levels being studied.

At the **institutional level**, relationships were developed with 13 elementary schools: 8 received SRTS program assistance including mini-grants (intervention) and five received only evaluation materials (control). Parent surveys, travel tallies, student travel questionnaires, and traffic counts, provide data on student commuting behavior, parent concerns, student-school proximity characteristics and school policies. The pedestrian environment data scan (PEDS) was utilized to identify road characteristics and pedestrian/bicycle facilities. These survey tools provide data necessary for assessing **individual changes** in students' walking and bicycling rates over one-year in the context of local programs and infrastructure changes. Through developing and providing



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reports and maps to each community on all data after the baseline measurements, schools were able to develop SRTS programs. Final results provide schools valuable data for evaluating outcomes and considering program changes.

At the **community level**, collaborations were formed with the County Department of Public Works (DPW) to share data on the schools, providing a direct link between the respective communities and the institution responsible for the roadway infrastructure. This collaboration also provided data on the agency's current and prospective infrastructure projects, prioritization, and capacity.

At the **policy level**, participation in the Complete Streets task force meetings, Hawaii SRTS Network meetings, Bicycle Plan stake-holder meetings, and Pedestrian Plan citizen's advisory meetings, formed the greater policy picture affecting individual behavioral changes with children at the study schools. Participant-observation data collection techniques were used to collect qualitative data during the meetings, providing valuable insights into infrastructure or program changes that might have affected the study schools. Understanding broad policy changes allowed the project to give feedback to the school communities. Conversely, the analysis of the study schools provided insight to team members to articulate the situation and needs of the schools at policy meetings.

### **Results:**

After six months of the HO'ALA project, baseline data have been collected on and presented to eleven study schools. Nine schools have held town-hall meeting to initiate SRTS programs. A relationship has been established with the County DPW. Nine policy meetings have been attended, in which HO'ALA project members have given input based on the school findings. Developments in policy meetings have been favorable to improving pedestrian and bicyclist safety statewide; however with the exception of Hawaii SRTS Network meetings developments in regards to specifically serving elementary schools have been minimal. Post-test data will be collected in late 2010.

### **Conclusions:**

Through involvement at the public policy, community, institutional, interpersonal and individual levels the HO'ALA project has engaged in comprehensive action and used the feedback for analyses in efforts to increase walking and bicycling to and from school. In this process the importance of such multi-level action and communication between stakeholders for the different levels has become increasingly evident.

### **Support:**

This project was funded by the Robert Wood Johnson Foundation through Active Living Research, Round 9 - Rapid Response.



### 2) Sociodemographic, Family and Neighborhood Characteristics Associated with Physical Activity in Parks

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#### **Background:**

Insufficient physical activity contributes to obesity in youth. Parks and other places to engage in physical activity provide an important resource that may influence levels of physical activity. Several studies have reported on barriers to and correlates of park use. However, there has been less research examining park-based physical activity and few population-based studies. The majority of the previous research has been observational studies of park users or smaller local surveys (often focusing on park users) designed to investigate associations with park characteristics. As a result, previous studies have not examined the association of park-based physical activity with a range of individual sociodemographic and family characteristics such as race/ethnicity, household income, and parental education, as well as neighborhood characteristics such as perceptions of park safety and neighborhood racial composition. In addition, previous studies have not included sufficient sample size to examine park-based physical activity for a number of different racial and ethnic groups such as Latinos, Asians and American Indians.

#### **Objectives:**

This research examines individual sociodemographic, family and neighborhood characteristics associated with park-based physical activity among adolescents using a population-based dataset that includes a number of sociodemographic and family characteristics not available in previous studies of park-based physical activity.

#### **Methods:**

Data were from the 2007 California Health Interview Survey (CHIS), a random-digit dial (RDD) telephone survey of households drawn from every county in California. Analyses included responses from 3,636 adolescents ages 12-17. Adolescent responses to the following question were used to assess park-based physical activity: The last time you went to a park, were you physically active while you were there? Logistic regression analyses were used to examine the association of individual sociodemographic, family and environmental characteristics with engaging in physical activity at a park. The following individual characteristics were included: age, gender, race/ethnicity (white, Latino, Asian, African American and American Indian), and nativity. Family characteristics included household income, parental education, mother's nativity, and father's nativity. Neighborhood characteristics included urbanicity (urban, suburban and rural), perceptions of park availability and safety, neighborhood income, and neighborhood racial composition.

#### **Results:**

In California, 71% of adolescents reported being physically active the last time they visited a park. After adjusting for the individual, family and neighborhood characteristics mentioned above, the present analyses showed that older adolescents were less likely to be physically active in parks than younger adolescents (OR=0.85, CI=0.79-0.91), and girls were less likely to be active in parks than boys (OR=0.60, CI=0.48-0.74). Asian adolescents were less likely than whites to be physically active in parks (OR=0.57, CI=0.37-0.89), but Latino, African American, and American Indian



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adolescents were not significantly different from whites. Adolescents whose father was foreign-born were more likely to be active (OR=1.56, CI=1.10-2.21).

Both having a park in walking distance of home and perceptions of the safety of the park were significantly associated with park-based physical activity. Adolescents who reported having a park within walking distance of home were more likely to have been physically active on their last park visit (OR=1.91, CI=1.45-2.51). Adolescents who strongly agreed that their nearby park was safe were more likely to have engaged in physical activity the last time they went to a park (OR=3.02, CI=1.58-5.77). In addition, adolescents in neighborhoods with a higher proportion of Latino residents were less likely than adolescents in neighborhoods with a lower proportion of Latino residents to have engaged in physical activity the last time they went to a park (OR=0.75, CI=0.58-0.98).

### **Conclusions:**

Increasing availability of parks is often recommended as an environmental change that can promote active living. However, little is known about population-level disparities in park-based physical activity among adolescents. The current results suggest that there are racial/ethnic and neighborhood socioeconomic disparities in park-based physical activity at the population level. Specifically, Asian adolescents and adolescents in neighborhoods with a higher concentration of Latino residents were less likely to have been active during their last park visit. In addition, adolescents who perceived greater availability and safety of nearby parks were more likely to engage in park-based physical activity after adjusting for a range of individual and family characteristics. To our knowledge, no previous studies have included this range of sociodemographic, family and neighborhood characteristics in examining associations with park-based physical activity among adolescents. The current results provide information that can inform and help target interventions intended to increase physical activity in parks.

### **Support:**

This work was supported by a grant from The California Endowment.



### 3) Association of Physical Activity with Park Safety and Park use: Variations by Neighborhood Racial Composition

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#### **Background:**

Lack of physical activity is associated with obesity in youth. African American and Latino adolescents have higher rates of obesity and are less physically active than their white counterparts. The availability of places to engage in physical activity is an important characteristic of the environment that may influence levels of physical activity. However, low-income neighborhoods and communities of color have fewer resources to support physical activity. Research suggests that disparities in access to these resources contribute to socioeconomic disparities in physical activity among adolescents. While a number of studies have explored disparities in access to physical activity resources (including walking trails, community centers, and commercial physical activity centers) in low-income areas and communities of color, few have examined the association of physical activity with the availability of parks and other spaces, perceptions of safety, and use of parks among adolescents as a function of neighborhood racial composition.

#### **Objectives:**

This research used a population-based dataset to examine the association of physical activity with park availability, perceptions of park safety, and park use among adolescents living in predominantly white, predominantly non-white, or predominantly mixed race neighborhoods adjusting for a range of individual, family and environmental characteristics.

#### **Methods:**

Data were from the 2007 California Health Interview Survey (CHIS), a random-digit dial (RDD) telephone survey of households drawn from every county in California. Analyses included responses from 3,636 adolescents ages 12-17. A validated self-report question was used to assess the number of days adolescents were physically active for 60 minutes or more. Regression analyses were used to examine the association of perceptions of park availability, perceptions of park safety, and park use with physical activity for adolescents living in predominantly white, mixed race, or predominantly non-white neighborhoods. Analyses adjusted for the following individual, family and environmental characteristics: age, gender, race/ethnicity (white, Latino, Asian, African American and American Indian), household income, parental education, parental nativity, neighborhood urbanicity (urban, suburban and rural), and neighborhood income.

#### **Results:**

In California, adolescents were physically active for at least 60 minutes on an average of just 3.6 days in the last week. Adolescents living in predominantly non-white neighborhoods were active on fewer days than those living in predominantly white neighborhoods (3.3 vs. 3.9,  $p < 0.001$ ). In addition, adolescents living in predominantly non-white neighborhoods were less likely to report having a park within walking distance, less likely to perceive nearby parks as safe, and less likely to have recently visited a park than adolescents in predominantly white neighborhoods.

In regression analyses stratified by neighborhood racial composition, girls were active on fewer days than boys in all three neighborhood types. In addition, adolescents who recently visited a park



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were active on more days than adolescents with no recent park visit in all three community types. However, reporting a park within walking distance of home was not associated with physical activity for adolescents in any neighborhood type. Associations between physical activity and individual race, household income, and perceptions of park safety varied according to neighborhood racial composition. Among adolescents living in predominantly non-white neighborhoods, adolescents from low-income families were active on more days per week than adolescents from higher-income families. Among adolescents living in mixed race neighborhoods, Latino and Asian adolescents were active on fewer days per week than white adolescents, and adolescents who perceived their nearby parks were safe were active on more days per week than those who perceived the parks as unsafe. For adolescents living in predominantly white neighborhoods, Latino adolescents were active on fewer days per week than white adolescents, and foreign-born adolescents were less active than US-born adolescents.

### **Conclusions:**

The creation of places to engage in physical activity is a recommended strategy for promoting physical activity. However, there are variations in availability of physical activity resources by neighborhood socioeconomic status and more research is needed to understand the factors associated with physical activity and use of parks in different types of neighborhoods. The current results indicate that regardless of neighborhood racial composition, visiting a park is associated with greater physical activity among adolescents. Perceived safety of parks may be more important for youth living in mixed race neighborhoods than for youth in predominantly white or non-white neighborhoods. These findings suggest that efforts to increase use of existing parks may be a promising strategy for promoting physical activity for youth in a variety of different neighborhoods. However, the findings also suggest that these efforts could be more successful if they are targeted to particular groups such as Latinos or Asians.

### **Support:**

This work was supported by a grant from The California Endowment.



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### 4) Social and Cultural Environments Influencing Physical Activity among African American Adolescents

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#### **Background:**

African American youth are at high risk for physical inactivity and the concomitant risks for obesity and negative metabolic consequences. A growing body of evidence suggests that persons living in activity-friendly environments engage in more physical activity (PA); however, recent findings suggest that the presence of facilities alone may not lead to increased activity among minority youth. Social and cultural environments may interact with the built environment to influence physical activity. While a growing body of research has evaluated aspects of the built environment, little attention has been devoted to social and cultural environments that encourage physical activity among African American adolescents.

#### **Objectives:**

Using a participatory-based and systematic approach, this study focused on identifying social and cultural environments that influence physical activity among African American 12-14 year olds.

#### **Methods:**

Adolescents were recruited using print advertisement (newspaper ads, flyers) and snowball sampling. A sample of 71 African American adolescents (girls = 44; boys = 27) residing in metropolitan Birmingham, AL participated in the study. Using a concept mapping protocol, data were collected and analyzed in a series of consecutive steps. First, youth participated in gender-specific focus groups in which participants responded to the brainstorming focus prompt, "What about your family, friends, and community, encourages you to be physically active?" Responses were gathered using the nominal group technique to elicit ideas from each participant until all ideas were exhausted and saturation was reached.

Next, research staff combined statements from multiple groups and refined statements to reduce redundancy and edit statements for clarity. Then, participants were invited back to a subsequent meeting in which they were instructed to sort the final statements into piles based on similarity in meaning. After the sorting task, youth rated each statement based on its importance relative to the other statements included in the set (5 = most important, 1 = least important). Data were analyzed using Concept Systems ® software, a multidimensional scaling (MDS) method and hierarchical cluster analysis, that produces graphical and map representation of the summary data.

#### **Results:**

The initial brainstorming focus groups resulted in 58 statements from girls and 108 statements from boys. The final combined data set included 84 unique statements in response to our focus prompt. The MDS analysis was based on a 10 cluster solution which generated a stress value of .2486. The stress value is indicative of the goodness of fit of the cluster analysis relative to the original data, with lower ranges (0.205-0.365) suggesting a better fit. The 10 clusters that emerged as factors that encourage physical activity for African American adolescents include: physical activity with family



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members, sports competitions, physical activity with peers, parental expectation for youth to be physically active, family and peer encouragement, access/availability of programs and services, community support, self-motivation for physical activity, being an idol or role model, and media and body image. Family and peer encouragement and sports competition emerged as the themes that were most important for influencing physical activity. We initially analyzed data separately for boys and girls; though overall, both were similar in their ratings of the relative importance of each cluster ( $r = 0.91$ ) indicating a strong positive correlation between cluster ratings.

### **Conclusions:**

Younger African American adolescents identified social and cultural environments that most influence their level of physical activity. Participating in physical activities with family and friends, as well as, engaging in competitive sports are among those activities rated as most important for both girls and boys. Future efforts to empirically evaluate the association between these social and cultural factors and actual physical activity are warranted. Should expected associations be found, multifaceted intervention approaches that address the built and social/cultural environments may be most successful in increasing physical activity among African American youth.

### **Support:**

This research is supported by Active Living Research (RWJF grant #65659).





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### 5) Observed Physical Activity by Park Setting among Youth by Gender, Age, and Race/Ethnicity

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#### **Background:**

Population-level solutions are needed to improve youth physical activity (PA) participation. Parks have been acknowledged as important PA settings given their low cost and widespread availability (Bedimo-Rung et al., 2005). A small body of literature has employed observational methods to document the PA that occurs in parks (e.g., Cohen et al., 2007; Floyd et al., 2008), but more research is needed to understand park-based PA behavior, particularly among youth. Further, only limited analyses have described the intensity of activity that occurs in specific areas of parks, and none to date have examined such variations according to age, gender, or race/ethnicity.

#### **Objectives:**

The purpose of this study was to explore differences in youth PA intensity across park settings by gender, age, and race/ethnicity.

#### **Methods:**

Four parks in Kansas City, Missouri (26-129 acres each) were divided into 14-28 observable target areas per park (e.g., trails, playground, and open space). A modified version of the System for Observing Play and Recreation in Communities (SOPARC; McKenzie et al., 2006) was used to record the PA of park users by gender (male, female), age (child, teen, adult, senior), race/ethnicity (White, Asian, Black, Hispanic, Other), and intensity level (sedentary, moderate, vigorous). The study occurred in July-August 2009. Each park was observed for a total of 39 hours (Fri-Sun, 7am-8pm) which were spread across two weekends per park. Inter-observer reliability tests yielded intraclass correlations across raters that ranged from 0.89 to 0.98 for all recorded user characteristics.

For this analysis, only data on youth - comprised of child (2-12 years) and teen (13-20 years) observations - were included. In addition, to ensure a sufficient sample size to make comparisons across race/ethnicity groups, Asian, Black, Hispanic, and Other were collapsed into a non-White category. Finally, we only compared PA behavior across the five park settings most-used by youth (open space, paved trail, playground, pool/splash pad, and picnic shelter).

We employed methods similar to previous studies (e.g., Cohen et al., 2007; Floyd et al., 2008) to compare differences in energy expenditure (EE) between the five park target areas. To begin, for each observation session within a target area, a total EE variable for each of seven groups (i.e., male, female, child, teen, White, non-White, and all youth) was calculated. This was accomplished by taking the total number of individuals observed at each intensity level (e.g., child sedentary sum), multiplying each total by the respective EE constant value (i.e., sedentary x 1.5, moderate x 3, vigorous x 6), and then adding together the EE sums for each intensity level (e.g., childsedEE + childmodEE + childvigEE). We then calculated the average EE per person in each of the groups (e.g., childavgEE) by dividing the total EE for that group by the total number of individuals observed in that group. Finally, within each user group (i.e., male, etc.), ANCOVA was used to compare the average EE across the five target areas, controlling for the park in which the observations occurred,



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the total user count for the target area, and the proportions of individuals observed as male, White, and child (when these variables were not used to stratify the sample). Significant ANCOVAs were followed by Sidak post-hoc comparisons to examine differences in EE between individual target areas.

### Results:

A total of 8612 users were observed across the four parks, of which 2451 were youth. Of these youth, 50.3% were female and 49.7% were male, 78.9% were children and 21.2% were teens, while 50.2% were White and 49.8% were non-White. The five areas most-used by youth included paved trails (n=678), playgrounds (n=651), open space (n=504), pools/splash pads (n=258), and picnic shelters (n=201).

Average EE ranged from  $M=0.85$  to  $M=3.02$  across the five target areas, with users in picnic shelters exhibiting the lowest average EE and playground users the highest EE (except among teens). The ANCOVAs indicated statistically significant differences across the five target areas in average EE for the child ( $F=3.07$ ,  $p=.018$ ), White ( $F=2.81$ ,  $p=.027$ ), and all youth ( $F=2.84$ ,  $p=.026$ ) samples. For each of these significant omnibus comparisons, post hoc tests ( $p<.05$ ) indicated that playgrounds had greater EE than picnic shelters (child:  $M_{play}=3.01$ ,  $M_{picnic}=2.12$ ; White:  $M_{play}=2.98$ ,  $M_{picnic}=2.07$ ; all youth:  $M_{play}=2.97$ ,  $M_{picnic}=2.15$ ). Differences in EE were not found between target areas for any of the other gender, age, or race/ethnicity groups.

### Conclusions:

Understanding how youth use parks, including variations by race/ethnicity, age, and gender can inform park planning efforts designed to foster greater levels of physical activity and reduced childhood obesity. Our findings suggest that among the most-used activity areas, there were few differences in average EE among youth, but that playgrounds were particularly active venues for the overall youth, child, and White samples. Future research should explore both similarities and differences in activity patterns and how the potential of parks can be maximized to promote the health of all youth.



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### 6) A Community Collaborative Approach for Implementing Active Living Strategies in Holyoke Massachusetts

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#### **Background:**

Holyoke, Massachusetts is a small industrial city with a population of approximately 40,000 individuals according to 2000 Census. Forty one percent of Holyoke's residents are Latino with over 20% of families living below the poverty, almost two times the national average. These high rates of poverty coupled with rising rates of obesity and other health issues make Holyoke a prime site for implementing Active Living strategies. Concern for the health and well-being of Holyoke has brought together a diverse group that includes community organizations, health institutions and government agencies to form the Holyoke Food and Fitness Policy Council. The council has partnered with community residents, both youth and adult, to address these concerns. The group applied and was accepted as one of nine pilot cities in the United States to implement the Healthy Initiatives grant awarded by the W.K. Kellogg Foundation.

#### **Objectives:**

Over the past three years Holyoke Food and Fitness Policy Council has worked in partnership with local health, fitness, agricultural, government and community groups on the planning phase of the W.K. Kellogg grant. This phase included community recruitment, surveys and data collection.

#### **Methods:**

Information was collected through a community participative process that included forums, questionnaires, health studies and activities. Community identified needs were documented through personal narratives and collected statistics. This data identified community issues around access to healthy foods, safe recreations' spaces and school wellness resulting in the creation of three major active living strategy umbrellas.

#### **Results:**

The Holyoke Food and Fitness Policy Council is in its first year of implementing various active living strategies. Under the "built environment" strategy umbrella, community groups, agencies and residents collect and analyze data, implement and assess initiatives. Projects include a wide scope of infrastructure changes, community education and resource development. These are some of the ongoing projects implemented throughout the city.

1. Complete streets a project spearheaded by community members and sponsored by city officials took the task of assessing conditions of the cities sidewalk infrastructure. Rating sidewalks based on safety, accessibility, cleanliness, and lighting, the community documented the areas needs. Based on the assessments, the city used the data to rank ongoing infrastructure projects and decide on several major side walk reconstructions. This project to date improved conditions and increased use in several of the downtown walkways.
2. Safe Routes to Schools spearheaded by collaborative partner Homework House addresses the need for safe walking routes to school for children. Children meet daily at the community site and walk as a walking school bus with parents, volunteers and homework house staff. This



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program enforces active lifestyle habits while providing a safe alternative to motor vehicle transportation to school. This project's success in one area is leading to the expansion of walking school busses to other schools throughout the city this year.

3. The Community Walking Committee is a partnership of city residents and officials that meet twice a month to discuss and identify city infrastructure projects. It is a collaboration that works towards improving the walkability, bikeability, and parks in the city. Some of the ongoing projects include several walking paths for school age children, park reconstruction and bike lanes.
4. A Community Bike Shop is a collaboration of several agency partners that stemmed from the need for bicycle access and bike safety education for residents of the city. Through generous donations of bicycles the community bike shop provides individuals the opportunity to learn how to build, fix, maintain and safely ride bicycles free of charge. Many individuals have benefited through this program by receiving bicycles as part of a build-a-bike initiative. The program's success is clear as seen through the increased number of safe bicycles on the streets.
5. Organized bike rides take place on a weekly basis teaching and reinforcing safe riding techniques. Helmets are provided at no cost to any participants in need. This project has not only increased ridership but has also identified locations of potential bike lanes, currently being reviewed by the city.
6. Safe Kids a collaborative partner has been working with city and community groups to make intersections safer. Some of the more dangerous intersections have been equipped with pedestrian friendly crossings. New traffic signals and educational demonstrations have also improved pedestrian safety. These initiatives are only a few of active lifestyle strategies being implemented in Holyoke, MA. These research based efforts demonstrate how barriers to healthy active living can be resolved through collaborative projects supported by a wide variety of partners.

### **Conclusions:**

The work of the Holyoke Food and Fitness Policy Council demonstrates the success of a wide variety of initiatives that focus on improving resources for active living strategies. This pilot project is a model for health strategies across the United States and demonstrates the importance of a community-wide collaborative research action approach.



### 7) Evaluation of Statewide Policies to Increase Physical Activity in Physical Education and at School

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#### **Background:**

Physical Education (PE) provides an important opportunity for children and adolescents to meet the recommended 60 minutes of moderate-to-vigorous physical activity (MVPA) per day. However, previous reports showed that few schools are providing sufficient time in PE. Although efforts are being made to increase the amount of PE offered in schools, time in PE does not necessarily translate to time in MVPA. In most studies, students spend less than 50% of PE time in MVPA, with even lower numbers for students in lower income schools. Increasing energy expenditure through PE could reach most youth on a daily basis and contribute to overweight and obesity prevention.

#### **Objectives:**

The objective of this study was to identify states with laws or policies that addressed physical activity in PE or during the school day, and to evaluate the specificity and strength of these “school physical activity policies.”

#### **Methods:**

Policy documents were obtained from databases and previous reports. PE coordinators at all 50 states were contacted to verify whether their state had a school physical activity policy. A 3-point scale was used to rate the identified policies on specificity and strength using an adapted version of the School Wellness Policy Evaluation Tool developed by Healthy Eating Research. A policy with high specificity contained clear statements and goals without loopholes or confusion. A policy with high strength included language to indicate that action is required. Interviews were conducted with PE coordinators in the states that had a school physical activity policy to gather information on implementation, evaluation, monitoring, and enforcement.

#### **Results:**

Sixteen states were identified as having a school physical activity policy; 11 were laws and 5 were policy documents issued by the state’s Department of Education. An additional 3 states had documents that were considered recommendations as opposed to policies and were excluded from the analysis. All but 1 of the school physical activity policies were adopted since 2005, with 2 being adopted in 2009 and 4 in 2010. Policies ranged in their specificity and strength. Seven states had a policy addressing amount of physical activity in PE, although 1 of the 7 required “sufficient” MVPA in PE for health benefits as opposed to stating a specific amount (e.g., 50% of PE in MVPA). Thirteen states had a policy addressing the amount of daily or weekly physical activity in school. However, for 6 of the 13, the term “physical activity” could be interpreted as “physical education” or “physical education plus recess.” Six states were given a top rating (3 out of 3) because their policy contained specific wording about MVPA and strong verbs such as “require.” The most comprehensive policies addressed each of the following: MVPA time during the school day or week, percent of MVPA in PE, and time in PE. No policy documents clearly addressed funding, implementation, monitoring, evaluation, or enforcement. The 16 state PE coordinator interviews revealed that, in most states, each local education agency or district was responsible for



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implementation, with the state's Department of Education and/or PE coordinator overseeing the implementation. Seven of the 16 states were recipients of CDC/DASH Coordinated School Health grant funding. Coordinators from these 7 states and 3 additional states reported high levels of collaboration between their Departments of Education and Health. PE coordinators reported providing technical assistance, resources, and statewide and/or regional trainings to support implementation, although some coordinators noted lack of funding as a barrier to providing such support. Most states did not provide funding to implement their school physical activity policy; 2 states had some funding for schools serving disadvantaged students. PE coordinators reported little or no monitoring and no enforcement of their school physical activity policy. Most coordinators mentioned using self-report checklists or questionnaires that were either required or optional for schools or districts to complete, and most viewed their role as providing support to help schools meet policy goals rather than being an enforcer.

### **Conclusions:**

Providing adequate MVPA in schools could reach virtually all youth, but only 16 states had laws or policies related to the amount of physical activity in schools. Further, only 6 of these states' policies were specific about the amount of MVPA and had strong wording about requirements. Despite longstanding recommendations from US Department of Health and Human Services' Healthy People Objectives, only 6 states had policies requiring 50% MVPA in PE. It is unclear the extent to which policies are being implemented. Best practices included a recommendation to monitor MVPA with pedometers, specifying multiple options for increasing MVPA throughout the school day (such as classroom activity breaks and recess), providing approved curricula to schools, providing trainers to schools, and periodic visits by PE coordinators or district wellness coordinators.

### **Support:**

Funding was provided by the California Obesity Prevention Program and California Department of Public Health through a Centers for Disease Control and Prevention Nutrition Physical Activity and Obesity 805 Cooperative Agreement.



### 8) Psychosocial and Built Environment Associations with Physical Activity: Modeling Interactions in Ecological Models

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#### **Background:**

Ecological models postulate multiple levels of influence on behaviors and interacting effects across levels. Numerous studies have provided evidence that physical activity is affected by individual (e.g. self-efficacy, skills), social (e.g. social modeling, safety) and built environment attributes (e.g. neighborhood walkability, recreational facilities). However few studies have examined interactions of psychosocial and built environment variables. Determining possible interactions may provide guidance for multi-component intervention strategies to maximize effects on physical activity in a population.

#### **Objectives:**

To examine interaction effects of psychosocial and built environment variables predicting physical activity in the Neighborhood Quality of Life (NQLS) study. Physical activity outcomes included objectively measured total moderate-to-vigorous physical activity (MVPA), and self-reported walking for transportation and for leisure.

#### **Methods:**

The NQLS study, conducted between 2002 and 2005, was an observational epidemiological study designed to compare multiple health outcomes of adult residents from 32 neighborhoods stratified by objectively assessed "walkability" characteristics and median household income from the Seattle-King County and the Baltimore-Washington DC metropolitan areas. The sample included 2199 adults averaging 45.1 years of age; 48.2% were females; and 26% were non-white. Total MVPA was measured using accelerometers. Walking for transportation and leisure were measured using the International Physical Activity Questionnaire (IPAQ), long version. Using primarily validated survey measures, psychosocial variables included social support for MVPA, enjoyment of MVPA, benefits of MVPA, barriers to MVPA, and self-efficacy for MVPA. Built environment variables based on GIS measures included a neighborhood walkability index, count of private recreational facilities, and of public parks within a 1 km network buffer around each participant's home. Multi-level mixed regression models were tested using SPSS 15.0 to account for participant clustering within neighborhoods. In each model, one psychosocial variable, one built environment variable, and their interaction term were entered, adjusting for age, gender, education, ethnicity, marital status, number of people in the household, and number of motor vehicles per adult in the household as covariates. Psychosocial and built environment variables were only tested in relation to conceptually matched physical activity outcomes. An alpha level of 0.10 was used to identify significant interaction terms.



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### **Results:**

Thirty psychosocial by built environment interaction terms were tested, using the combination of five psychosocial and three built environment variables. Four significant interactions were found and all involved perceived benefits and recreation facilities. Specifically, perceived benefits of MVPA interacted with private recreational facilities and public parks to explain total MVPA and leisure walking. All four interactions identified a similar pattern where effects of perceived benefits on adults' physical activity were minimized when a large number of recreation facilities or parks were available. For example, when there were no recreational facilities within 1 km network buffer, adults with high perceived benefits of MVPA had 7.1 more minutes' leisure walking compared to those with low perceived benefits. However when there were two or more recreational facilities within buffer, adults with high and low perceived benefits had almost the same minutes of leisure walking.

### **Conclusions:**

Predictions from ecological models about likely interactions across levels of influence were partially supported. When there were no or few private or public recreation facilities near homes, there were substantial physical activity differences by level of perceived benefits. But when multiple recreation facilities were nearby, there was little variation in physical activity across perceived benefit levels. Results were replicated across two distinct physical activity measures. Increasing access to private or public recreation facilities could provide the most benefits to those who perceive fewer benefits of physical activity.

### **Support:**

This study was supported by Grant HL67350 from the National Heart, Lung, and Blood institute.





### 9) Opportunity Meets Planning: An Assessment of State Plans to Increase Physical Activity

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#### **Background:**

In 2010, the National Physical Activity (PA) Plan was released and included recommended strategies focused on eight sectors: public health; health care; education; transportation, land use and community design; parks, recreation, fitness and sports; business and industry; volunteer and non-profit organizations; and mass media. Prior to the release of the National Plan, however, most states already had developed statewide obesity-related plans, some of which included elements similar to the National PA Plan. Even though many of these plans have been in existence for several years, little is known about their breadth and, specifically, their focus on PA-related elements.

#### **Objectives:**

The purpose of this study was to develop a baseline analysis of the nature and extent of the PA-related elements included in the state obesity-related plans. Specifically, we examined the overall plan orientation (PA-specific, obesity, chronic disease, etc.); the entities involved in the plan development and whether they were reflective of a multi-disciplinary approach to PA (e.g., inclusion of land use/planning, transportation, and park/recreation representatives) and whether they overlapped with the 8 sectors included in the National PA Plan; endorsement from state officials; inclusion of data on the extent or lack of PA in the state; the relative proportion of plan elements focused specifically on PA/inactivity and whether they focus on infrastructure (e.g., workforce development) or content-related issues (e.g., physical education or urban design/planning). Finally, we examined the extent to which the plans included specific provisions for implementation and PA-related evaluation.

#### **Methods:**

Plans were obtained in early 2010 through Internet research and electronic mail follow-up with state officials to obtain the most recent plan for each state and D.C. A qualitative content analysis coding tool and associated coding decision rules were developed by a working group of the CDC-funded Physical Activity Policy Research Network (PAPRN). All plans were double-coded by two independent reviewers who were part of the PAPRN. All plan coding data were independently entered into an on-line survey system by each coder and were analyzed using SPSS v. 17.

#### **Results:**

Forty-three states (84.3%) had a statewide plan as of June 2010. Thirty-four (79.1%) of the plans specifically included PA or PA-related language in the plan title; the remaining plans were broader - focusing on obesity generally, chronic disease, or health in general. Plans were adopted between 2002 and 2010, with 2005 as the mode and 2006 as the median. Only 29 (69%) of the plans had clear beginning and end dates. Plan length ranged from three to 10 years with most (55.2%) covering 5 years. Most plans were endorsed by the Director of Health (46.5%) or the Governor (20.9%). Most plans were developed with partners in public health (97.7%), education (88.4%), health care (79.1%), university faculty (81.4%), non-profits (81.4%), advocacy/coalition groups



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(79.1%), and park/recreation/fitness (62.8%). Transportation (48.8%), land use and community design (30.2%), and elected officials (20.9%) were less likely to be included.

Almost all of the plans presented data on the obesity problem in their state (95.3%) and most included data on physical inactivity (88.4%). However, less than half of the plans presented PA/inactivity data broken down by gender (34.9%), race (30.2%), income (20.9%) or geographic location (7.0%). Almost all plans (95.3%) clearly specified their overall goals and objectives. On average, 44% of the overarching goals included in the plans were PA-oriented. In assessing both the PA specific goals and strategies, 58.1% of the plans addressed workforce development, 67.4% coalition building, 67.4% surveillance, 48.8% evaluation, 83.7% policy change and 82.4% environmental change. The vast majority of plans included goals and strategies focused on physical education (79.1%) and slightly less than 1/3 focused on other education issues, mainstream health care issues, and worksites. Few of the plans included specific goals/strategies focused on land use/urban design or parks/recreation/fitness (18.6% each) and only 16.3% focused on transportation infrastructure issues. Only 57.1% of the plans included sections on evaluation and most plans (69.8%) did not assign specific organizations or groups to implement the strategies.

### **Conclusions:**

Of the 43 states with a statewide plan, many were broad in scope but lacked an in-depth PA orientation. While some of the plans addressed the sectors included in the National PA plan, none addressed all of the sectors and many focused on “traditional” PA elements related to physical education as opposed to sectors affecting the built environment and active living (i.e., parks and recreation, land use/community design, and transportation). This analysis provides an important baseline assessment of where state plans stand in comparison to the National PA Plan as well as a starting point for states as they begin the plan revision process in the coming months and years. Future studies should include a longitudinal study of plans over the course of implementation of the National Plan as well as assess how the plans vary by state characteristics.

### **Support:**

This study was funded by the CDC’s Physical Activity Policy Research Network.



### 10) Worth its Weight (loss) in Gold: The Effects of Utah's Gold-Medal School Policy on Adolescent Obesity by Neighborhood SES and Minority Status

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#### **Background:**

Little population-based research has been undertaken of the effectiveness of school policies directed toward childhood obesity, much less on variation of impact across socioeconomic and demographic characteristics of neighborhoods. Utah's Gold Medal School Program (GMSP), a state-based wellness program, was legislated for voluntary adoption by elementary schools beginning in 2001. We performed a multilevel analysis of the effects of GMSP physical education and nutrition policies on adolescent obesity for the cohort born in 1990-1992 and exposed to such policies between 2001-2004.

#### **Objectives:**

Identify the effects of elementary nutrition and physical education policies on adolescent obesity for the 1990-1992 birth cohort, with specific focus on low-income and minority groups.

#### **Methods:**

Multilevel analysis of the effect of the GMSP on adolescent obesity was undertaken, including the extent to which such effects were modified by socioeconomic characteristics of neighborhoods where students reside. Data were taken from the Utah Population Database (UPDB), a genealogically-linked resource comprised of administrative data on all residents. Most individual and household characteristics were taken from birth certificate records, whereas height and weight were extracted from linked driver's license records. Residential information was used to geo-code and link block-level characteristics as well as elementary school assignment. School boundary information was available only for Salt Lake County and Utah County, limiting the sample to about 30 elementary schools with wide variation in adoption of GMSP provisions. The resulting sample for the 1990-92 birth cohorts exposed to the GMSP by 2001 was 30,512. Hierarchical linear modeling was performed on the odds of overweight, obesity, and severe obesity associated with extent of adoption of the GMSP and with its interaction with neighborhood characteristics, controlling for individual and household characteristics. Selection was tested based on multilevel results for cohorts born in 1983-1988 unexposed to GMSP policies, using area-wide maternal BMI as an instrument.

#### **Results:**

Higher level adoption of the GMSP significantly reduced the odds of adolescent overweight and obesity, particularly for those in the most disadvantaged neighborhoods and with the higher concentration of Hispanics. These ecological results were manifest beyond the individual socioeconomic and minority characteristics of individuals and households. Results were not attributable to selection of individuals into neighborhoods. Both nutrition policies and physical activity policies significantly reduced the odds of obesity.



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**Conclusions:**

This analysis suggests that childhood obesity can be managed through concerted policy efforts at the elementary school level, particularly for those at greatest risk.

**Support:**

Intramural Research Grant, University of Utah



### 11) Is Longer Better? The Effects of Duration of Exposure to School Wellness Policies on Adolescent Obesity

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<sup>3</sup>*Department of Sociology, University of Utah*

#### **Background:**

Close to one-third of American adolescents are overweight. Policy makers have identified the school environment as a potential arena in which to implement policies aimed at reducing the prevalence of adolescent overweight and obesity. Perhaps the most significant federal policy enacted to date aimed at altering school environments to encourage healthier living practices among children was the 2004 Child Nutrition and WIC Reauthorization Act (CNRA). The CNRA required that all local education agencies receiving federal funding establish comprehensive school wellness policies no later than the 2006/07 school year. The CNRA legislation did not mandate school districts enact specific policies, but required the establishment of wellness policies that set goals in the areas of nutrition, competitive foods, physical education/activity, and other wellness related initiatives.

#### **Objectives:**

This analysis evaluated the correlation between duration of exposure to school wellness policies, as mandated by the 2004 CNRA legislation, and adolescent overweight and obesity prevalence rates. Specifically, the impact of longitudinal exposure to the district based wellness policy groups of competitive foods, physical education/activity, and other wellness related initiatives on adolescent overweight and obesity was examined.

#### **Methods:**

Data was extracted from the 1990-1992 birth cohort of the Utah Population Database (n=51,475), a data registry that genealogically links state administrative records such as birth certificates and driver's license data for all residents of Utah. Obesity/overweight risk was assessed based on self-reported height and weight at the time of a child's first driver's license. Familial characteristics such as mother's body mass index, educational attainment, and marital status were taken from the child's birth certificate. District-level socio-demographics and wellness policies were appended via geocoded residential addresses. A school district's commitment to wellness was assessed through each district's implementation of policies related to competitive foods, physical education, and wellness related initiatives in response to the 2004 Child Nutrition and WIC Reauthorization Act. All models were estimated using logistic regression, with controls for spatial clustering.

#### **Results:**

The results demonstrated longer duration of exposure to wellness policies, particularly those related to competitive foods and physical education/activity, was associated with significant reductions in adolescent overweight and obesity. Furthermore, the association between different wellness policy groups and reductions in overweight and obesity prevalence rates differed; for instance, physical education/activity related policies were associated with greater reductions in the prevalence of adolescent obesity relative to adolescent overweight.



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**Conclusions:**

Beyond simple exposure, these results support the conclusion that the consistent application of wellness policies may be required to effectively combat childhood overweight and obesity within the school environment. Consequently, the continuation of the wellness policy mandates included in the 2004 Child Nutrition and WIC Reauthorization Act is warranted.

**Support:**

This research was conducted at the University of Utah. We have no outside support to report.



### 12) Active Children Use More Locations for Physical Activity

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#### **Background:**

Regular physical activity (PA) is important for obesity prevention in children yet many children are inactive; therefore increasing PA is a public health priority. Several locations throughout communities may provide opportunities for children to be active, but there is limited research on use of these locations in relation to children's PA. Greater neighborhood availability of recreation facilities (e.g., parks, recreation centers) is associated with higher PA in youth, but it is unknown how often children use different PA locations and how this relates to their overall PA. In addition, ethnic differences in the use of PA locations may be the result of variation in promotion, access and support but evidence is inconclusive. Understanding the factors associated with children's use of locations for PA may help inform policy and PA promotion efforts.

#### **Objectives:**

We examined the frequency of use of eleven PA locations in a sample of 541 5-8 year old children living in San Diego (CA) and how frequency of use related to their total PA (objective and parent-reported). Potential correlates of PA location use were explored.

#### **Methods:**

This study was a cross-sectional analysis of baseline data from an obesity prevention intervention based in recreation centers (Project MOVE/Me Muevo). Parents reported their child's frequency of use (# of visits/week) of eleven PA locations (including parks, beaches, homes, recreation facilities). Composite variables were derived to represent the total number of PA locations regularly used ( $\geq$  once/week) and the total number of visits to any location in a typical week. PA was assessed by parent-report and accelerometry (subsample  $n=179$ ). Associations with child use of PA locations were examined for the following variables: biological (sex, measured BMI z-score), socio-cultural (ethnicity, income, parental education), and home factors (rules for PA; sedentary rules; logistic PA support; encouragement for less inactivity; home PA equipment; electronic media availability). These associations were tested for interactions by child sex and ethnicity. Associations between location use, potential correlates and PA were assessed using Pearson correlations. Associations between composite scores of PA locations (DV) and potential correlates (IV) were examined using multiple linear regression. Analyses were adjusted for sex, ethnicity, parent education and clustering within study recruitment areas.

#### **Results:**

Children were 45.0% male and 41.1% Latino, with a mean age of  $6.6 \pm 0.7$  yrs. The most frequently used PA locations were the home (Mean  $\pm$  SD  $3.2 \pm 2.3$  times/week), park or playground ( $1.6 \pm 1.3$  times/week), school grounds during after-school hours ( $1.5 \pm 2.1$  times/week), and friend or relative's home ( $1.3 \pm 1.4$  times/week). Children used an average of  $4.0 \pm 2.0$  different PA locations in a typical week, and made a total of  $12.5 \pm 6.8$  visits/week to all PA locations. Compared to non-Latino children, Latino children used fewer locations regularly (3.6 vs. 4.3 locations;  $p < 0.001$ ), had fewer total visits to all locations ( $11.4$  vs.  $13.2$  visits/week;  $p = 0.003$ ) and reported less frequent use of commercial facilities, neighborhood areas, their homes and friends' or relatives' homes (all



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$p < 0.05$ ). Accelerometry-based MVPA ( $r = 0.17$ ,  $p = 0.03$ ) and parent-reported PA ( $r = 0.29$ ;  $p < 0.001$ ) were positively associated with the number of PA locations regularly used. Parent-reported PA was positively associated with total visits/week to all locations ( $r = 0.36$ ;  $p < 0.001$ ), and to the use of public recreation centers, parks, trails, beaches, neighborhood space, their homes and friends homes (all  $p < 0.01$ ). Parental PA support and support for less inactivity were associated with total locations used and more frequent use of all locations (both  $p < 0.001$ ), after adjusting for covariates. Availability of PA equipment in the home was positively associated with the number of locations regularly used ( $p < 0.001$ ).

### **Conclusions:**

The diverse sample of 5-8 year-old children in the present study used an average of four different PA locations at least once per week. The four most frequently used locations were the home, park or playground, school grounds during after-school hours, and friends or relative's home. Latino children used PA locations less often than non-Latino children. Ethnic differences in use of PA locations may be due to variation in neighborhood availability of such facilities, but more research is needed to determine this. Parent support of PA was related to composite variables of location use, and the amount of PA equipment at home was significantly related to the number of locations regularly used. The number of PA locations used was significantly correlated with both objectively-measured and parent-reported PA suggesting that regular access to play locations may be required to impact habitual PA. Ensuring that all children have access to multiple locations where they can engage in spontaneous play may be an effective approach for increasing PA in this age group. Interventions based on present results would ensure that all children have regular access to places near their home for PA, reduce physical and social barriers to the use of those places, such as dangerous equipment and threat of crime, and encourage parents to support their children's PA through encouragement, transportation, and active participation.

### **Support:**

NIDDK





### 13) The Role of the Built Environment and Psychology on Bicycling and Walking Behavior: What Matters? What Comes First?

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#### **Background:**

A considerable volume of research links the built environment with travel behavior (Ewing & Cervero, 2010). One recent thread of that research focuses on the role of attitudes, with several researchers finding that attitudes may be as or more important than the built environment (e.g. Cao, Mokhtarian, & Handy, 2009; Kitamura, Mokhtarian, & Laidet, 1997; Schwanen & Mokhtarian, 2007). These findings point to the need to incorporate psychological theories when trying to explain travel decisions. The theory of planned behavior (TPB), developed by Icek Ajzen, holds that behavior is guided by (1) a person's attitude toward the behavior; (2) subjective norms, including the expectations of others; and (3) the person's perceived control over the behavior. A meta-analysis of 161 studies published through 1997 found that TPB accounted for 27% of the variance in behavior (Armitage & Conner, 2001). A handful of transportation researchers have applied the theory to travel mode choice (Bamberg & Schmidt, 2003; Beale & Bonsall, 2007). Two reviews of empirical studies of exercise provided validation of the TPB (Blue, 1995; Hausenblas, Carron, & Mack, 1997). Much of the research using models from psychology treat the built environment as an exogenous variable. However, someone who wants to bicycle to work regularly may choose to live in a place with good bicycle infrastructure. Therefore, attitudes may be influencing both the environment (in the housing location choice) and travel behavior (once the person has chosen their home). This complexity raises questions about the correct model structure for explaining these relationships and is often referred to as the issue of "self-selection" (Cao et al., 2009).

#### **Objectives:**

This research analyzes the relative roles of demographics, the built environment (objectively measured), attitudes, social norms, and perceived behavioral control (PBC) on walking and bicycling activity among adults.

#### **Methods:**

We conducted a random phone survey of adults in Portland, Oregon that included questions on: (1) attitudes, social norms, and PBC with respect to walking and bicycling for transportation; (2) frequency of walking and bicycling in the past month; (3) demographics; and (4) home location. Of the 992 respondents, we geocoded 853 and generated objective measures of their physical environment using GIS. Two forms of structural equation models were tested. The first form follows the convention often used in the psychology literature, where the built environment is an exogenous variable influencing attitudes, norms, and PBC. The second form attempts to account for location choice as such: attitudes -> built environment -> PBC -> walk/bike travel. Separate models are estimated for bicycling and walking.

#### **Results:**

The explanatory power of all four models is similar ( $R^2=0.47 - 0.58$ ). Comparing the models, we found that:

- Social norms may influence the decision to walk, but not to bicycle



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- Attitudes play a more significant role in bicycling compared to walking
- The built environment influences behavior mainly through PBC
- Bicycle lanes are positively associated with PBC

### **Conclusions:**

The analysis confirms the important roles that both attitudes and the built environment play in active transportation, though the effects differ for walking and bicycling. The models that account for location choice explain similar shares of variation, but may make more theoretical sense

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### **Support:**

This research was funded by the Oregon Transportation Research and Education Consortium and the City of Portland.



### 14) GIS Environmental Determinants of Objectively Measured Physical Activity and Intervention Uptake in Children

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#### **Background:**

Although physical activity fosters healthy development among children (such as reducing obesity and type 2 diabetes risk as well as promoting positive mental well-being), less than half of children meet national physical activity guidelines. The accumulating research indicates that neighborhood environmental characteristics (e.g. access to walking destinations and community design) may facilitate or impede physical activity among children. However, the vast majority of studies in this area exclusively rely on self-reported physical activity measures and do not evaluate the scale or zoning sensitivity of the neighborhood definition used. Additionally, little is known empirically about environmental influences on intervention uptake.

#### **Objectives:**

The primary aim of this investigation was to examine gender-stratified relationships between neighborhood environment characteristics and physical activity by different neighborhood definitions (i.e. 200-meter, 400-meter and 800-meter street network and circular buffers). A secondary aim was to examine if neighborhood environment factors impact the uptake of an after-school obesity prevention intervention on physical activity level among children.

#### **Methods:**

Data come from the YMCA-Harvard After School Food and Fitness Project, a multi-site quasi-experimental intervention targeting children ages 5-12 and their families focused on changing afterschool environments to promote physical activity and healthy eating. The analyses to address the first study aim include baseline data collected from children who had georeferenced home addresses and at least two days of accelerometer data (N=407). For our second aim, relationships were evaluated for children in the intervention group who met the criteria for the first study aim and had complete baseline and follow-up accelerometer data with at least two days for both time points (N=201). We built a spatial database using geographic information systems (GIS) technology with ArcGIS 9.3, creating the following environmental variables: parks per sq km; walking destinations for retail, services, and cultural/educational activities per sq km; walking destination mix; residential density per sq km; intersections per sq km; median pedestrian route directness; and cul de sac presence. GIS data layers came from Info USA. Minutes per day of moderate-to-vigorous physical activity is the primary outcome and overall physical activity (mean accelerometer counts per minute) is the secondary outcome. We used objective physical activity data collected with ActiGraph model 7164 accelerometers. Other variables included multiple individual and neighborhood characteristics. We first conducted exploratory spatial data analysis, including visualization and cluster detection. Visualization was conducted in ArcMap 9.3 to map key study variables and to visually examine patterns across space. Then, global cluster detection was conducted with a Global Moran's I to evaluate whether there is spatial autocorrelation for the outcomes. Next, we fit ordinary least



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squares (OLS) regression and spatial autoregressive models as appropriate. For example, if the residuals of the OLS were not significant for spatial autocorrelation, there was no indication that a spatial model is needed. If evidence for a spatial effect was found, spatial error regression models, estimated via maximum likelihood, were fit. The spatial weight matrix, which provides the structure of assumed spatial relationships, was specified as  $k$  nearest neighbors ( $n=4$ ). The models were adjusted for potential confounders and clustering of children within afterschool sites. To examine our second aim, if the after-school intervention uptake was influenced by the neighborhood environments of the participants, we limited the sample to only those in the intervention group and re-estimated regressions equations predicting change in physical activity levels with the neighborhood environment characteristics assessed in aim 1 found to be significant predictors, adjusting for baseline covariates as in aim 1 as well as baseline physical activity. In follow-up analyses, the regression coefficient represents intervention uptake, operationalized as the difference between of physical activity from baseline to follow-up.

### **Results:**

Preliminary analysis of one of the four afterschool sites indicate that the Global Moran's  $I$  for average accelerometer counts was low and not significant. We anticipate that access to walking destinations as well as community design will be positively associated with both types of physical activity, consistent with current literature. We also anticipate that these associations will vary by gender and vary depending on the definition of the neighborhood used. Lastly, we anticipate that the neighborhood characteristics will influence intervention uptake. All analyses will be completed by fall 2010.

### **Conclusions:**

This study may lend support to the burgeoning research indicating that neighborhood characteristics are implicated in physical activity among children, which has substantive neighborhood-level policy relevance, especially because the neighborhood characteristics we examined are: most consistently and strongly associated with physical activity among children, and amenable to policy change. This study also addresses methodological issues and fills several gaps that exist in the extant research literature, including related to the sensitivity of neighborhood effects by explicitly addressing the modifiable areal unit problem - demonstrating to health researchers that critical thought needs to be given when defining neighborhoods.

### **Support:**

This project is funded by an Active Living Research Dissertation Award from the Robert Wood Johnson Foundation (Grant # 67129).



### 15) Weighing the Impact of Governors' Public Support for State Childhood Obesity Prevention Legislation: An Exploratory Study

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#### **Background:**

Reducing rates of childhood obesity is a national priority. Policy changes hold promise for childhood obesity prevention because they can influence access, social norms, and opportunities for better nutrition and increased physical activity. In recent years, many states have introduced and adopted legislation that focuses on obesity prevention in school and community settings. State-level legislation is particularly important since much of the authority for public health policy lies at the state level, in the state laws, regulations and constitutional delegation to local authorities. Governors play an important role in state legislation. They may sign into law or veto legislation passed by the state legislatures and also influence priorities and funding for the state. Many state agencies benefit from a governor's support for efforts in obesity prevention. State funding for physical education programs, public health initiatives, trails and parks, all can contribute to opportunities for childhood obesity prevention through better nutrition and increased physical activity.

#### **Objectives:**

This study explores the patterns of gubernatorial support for child obesity prevention and correlations between Governors' messages of support for obesity prevention, legislative action, and child obesity rates. The purposes of this study were twofold: 1) to examine the patterns of gubernatorial support for childhood obesity prevention in State of the State addresses and press releases; and 2) to explore correlations between governors' public messages of support for obesity prevention, state childhood obesity rates, and enacted obesity prevention legislation.

#### **Methods:**

Using an online legislative database, an inventory of enacted state legislation (2006-2009) within 16 topics relating to childhood obesity prevention was collected. The number of enacted bills was totaled for each state, rank ordered, and divided into categories of low (0-5 enacted bills), and high enacted legislation (6 or more enacted bills). States' rates of childhood and adult obesity rates were rank ordered and divided into tertiles of low, medium, and high obesity. Using governors' websites, the research team collected State of the State addresses and press releases issued by the governors' offices. Total mentions of obesity and related issues and programs in State of the State addresses and press releases were tallied and coded for relevant topic areas. Enacted legislation was the dependent variable for each of the three logistic regression models. In the first regression, the independent variables were state child obesity rates, adult obesity rates, categories of State of the State addresses; and categories of press releases. Each of these variables was run separately as a categorical regression. For the second analysis the communications variables were re-coded as dichotomous variables - State of the State (low=0, high=1 or more) and press release (low=0-1, high=2 or more) - and run as binary logistic regressions. The final analysis summed the total number of State of the State addresses and press releases for each state and created a dichotomous total communications variable (low=0-1, high=2 or more) and was run as an unadjusted logistic regression.



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### **Results:**

References to obesity were made 1-3 times in 17 state of the state addresses from 2006 to 2009. Governors from 2/3 (n=33) of the states made no mention of obesity. Out of 24 total mentions of obesity in addresses, 17 specifically mentioned childhood obesity, 12 school related programs, 11 physical activity, 8 nutrition, 5 a statewide plan to address obesity, 6 the economic burden of obesity, and 4 healthcare, which was always associated with economic burden. States with two or more mentions of obesity or related programs in press releases and State of the State addresses between 2006 and 2009 were nearly 7 times (OR=6.72, 95% CI=1.93, 23.35) more likely to fall into the high enacted legislation category, while states with up to 1 mentions were nearly 7 times less likely to have high enacted legislation (OR=.149, 95% CI=.04, .51).

### **Conclusions:**

The current findings help identify gaps and opportunities in promoting policy efforts for preventing childhood obesity. The finding that there were many mentions of obesity in communications by governors is encouraging. However, even with the increasing focus on the national obesity epidemic, two thirds of the governors made no mention of obesity from 2006-2009. Considering the important role that governors have in state policy making it is not surprising that there is a relationship between governors' public messages of support for obesity programming and levels of enacted obesity prevention legislation. There is an opportunity for practitioners and advocates to educate the governors and their staffers on obesity issues and recommend public statements in all venues and this should be a topic of future study.

### **Support:**

RWJF #65559



### 16) Zoning for Health: Planners' and Decision Makers' Perceptions about the Links between Zoning and Health

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#### **Background:**

In 2007, Baltimore City began a three year process to revise and modernize its zoning code, which was last updated in 1971. As a fundamental tool of urban planning, zoning controls the built environment with a historic focus on regulating land uses and governing the placement, size, and design of buildings. Although zoning has the potential to shape the built environment in ways that impact health, zoning is in the purview of planning and not public health, and therefore it is critical for public health practitioners to better understand how the connections between zoning and health are perceived by those that create and influence zoning laws and land use policy.

We conducted a Health Impact Assessment (HIA) of Baltimore City's comprehensive zoning code rewrite in order to inform decision-makers about the health-promoting potential of the City's new zoning code. Our experience in Baltimore provides insights into the utility of HIAs and the potential of using zoning code reform as a policy avenue for improving public health outcomes in communities with significant socio-economic and health disparities.

#### **Objectives:**

As a critical component of our Zoning Code HIA, we sought to understand planners', decision-makers and other zoning stakeholders' perceptions about the possible health implications of the proposed zoning code changes.

#### **Methods:**

We conducted in-depth one-on-one interviews with the planners, consultants and lawyers charged with drafting the code, decision-makers who would be responsible for approving the code, city employees charged with implementing and enforcing the code, and other stakeholders who could provide perspectives on the impacts of the code (i.e. developers, citizens' planning groups, healthy food advocates). Each participant was interviewed once. Transcripts were read and analyzed by members of the research team, and key themes and content were identified. In addition to in-depth interviews, all public comment meetings held between June 14<sup>th</sup> and June 29<sup>th</sup>, 2010 following the release of the draft new code were attended and observed for specific content. During these meetings, notes about the content of the code, discussion of health-related concerns, and points of interest to the presenters and audience were noted.



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### **Results:**

Based on our interviews, participants and stakeholders of the recode process did not immediately link the zoning recode to health. When probed however, some interview participants did link zoning regulations to health, particularly with respect to creating “healthy communities”. In particular, interview participants discussed: 1) that links between zoning and health are often difficult to immediately establish, 2) that people are used to talking about zoning only in terms of physical arrangement of buildings and not in terms of human or social impacts, 3) that there is interest in how the rewrite can promote healthy communities, which was described as providing the resources needed for healthy living, and 4) that addressing health via zoning is in line with the city’s 2006 Comprehensive Plan. The health issues that interviewees mentioned as being potentially linked to zoning were: healthy foods access/increasing food choice, walkability, promoting transit/reducing parking, crime, obesity, and health disparities.

Interviewees identified the following as obstacles to zoning impacting health: 1) many factors other than zoning contribute to these issues, 2) changes in zoning may not lead to changes in physical environment, 3) there is little or no agreement on what features make a use “healthy”, 4) the ability for zoning to influence health will depend on how Baltimore’s new zoning code is mapped, and 5) addressing public health issues is not the main goal of the rewrite process. Participants also identified a series of ways they thought the City’s new zoning code might consider health: 1) using evidence about what creates a healthy neighborhood to inform the zoning code rewrite, and 2) accommodating people with a variety of abilities and needs.

Many themes related to health and the zoning code’s potential to help create healthy neighborhoods were also identified with analysis of notes from public meetings. These included discussions of: community gardens, food access, walkability, urban agriculture, transit oriented development, mixed use, and alcohol.

### **Conclusions:**

Despite having its roots in efforts to protect the general health, safety and welfare of citizens, the link between zoning and health was not immediately obvious to most City officials and stakeholders involved in Baltimore’s comprehensive zoning code revision. When probed however, many officials and stakeholders acknowledged that those connections likely existed, especially in the areas of healthy food access and walkability, which were also the health issues that community members mentioned the most. This suggests that bringing those links to the attention of planners and decision-makers through the use of HIAs and other similar tools could help shape zoning decisions in ways that are more health focused.

### **Support:**

This research was supported by a Rapid Response grant from the Robert Wood Johnson Foundation’s Active Living Research program (Grant No. 66853).





### 17) A Staging Tool to Measure the Capacity of Obesity Prevention Programs and Policies

*Carl Filler, MSW<sup>1</sup>, Katherine Stamatakis, PhD<sup>2</sup>, Mariah Dreisinger, MPH<sup>1</sup>, Beth Leinauer, BS<sup>1</sup>, Ross Brownson, PhD<sup>1,2</sup>*

*<sup>1</sup>George Warren Brown School of Social Work, Washington University in St. Louis, <sup>2</sup>Department of Surgery and Siteman Cancer Center, Washington University School of Medicine*

#### **Background:**

Diffusion theory (e.g., Diffusion of Innovation) suggests that programs and policies are developed and implemented in stages and are influenced by a variety of variables within an organization and in the macro environment. Much of the evidence around dissemination science has developed in fields outside of health (e.g., agriculture) and lacks a “user-friendly” tool that could be used to stage programs and policies in obesity prevention and other areas of chronic disease control (e.g., tobacco, diabetes). Therefore a tool was developed for Missouri Foundation for Health’s (MFH) Healthy & Active Communities program’s Model Practice Building (MPB) grantees.

#### **Objectives:**

The objectives of this project were to understand stages of dissemination of obesity prevention programs and to compare these with relatively more established tobacco prevention programs. Finally, MPB grantees (MFH-funded obesity prevention programs that are provided with ongoing implementation, evaluation, and dissemination assistance) were compared to both obesity and tobacco prevention programs.

#### **Methods:**

A previously constructed four-stage framework was used as a guide for assessing the programs. The first and second phases, “Awareness” and “Adoption,” assess the awareness of the issue by the community served and the view of the organization towards evidence-based interventions. The third and fourth phases, “Implementation” and “Maintenance,” are dependent upon the sustainability of the program, as well as broader organizational factors (e.g. local policies or support) that affect whether the program is able to be maintained. A final phase, “Organizational Climate,” assessed the ability of the organization to react, change, and adapt to new challenges, needs of the community, and changing evidence base. A total of 26 questions comprised the five phases, all on a seven point Likert scale. Obesity, asthma, diabetes, and tobacco prevention programs were contacted.

The survey was developed using cognitive response testing of public health professionals (n=11) selected by key stakeholders. The survey was then modified based on their feedback. Respondents for the pilot testing of the survey (n=277) were selected through snowball sampling of key stakeholders; other respondents were contacted directly through purposive sampling. The final sample included respondents from state health departments, local health departments, and community based organizations. With a total of 550 individuals contacted, the response rate was 50%. Respondents were also asked to take part in a retest (n=92) in order to assess reliability of the survey. Further work will examine the psychometric properties of the survey instrument using confirmatory factor analysis. For the purpose of this analysis, three groups were compared: MPB grantees (n=32), other obesity prevention programs (n=45), and tobacco programs (n=91).

### Results:

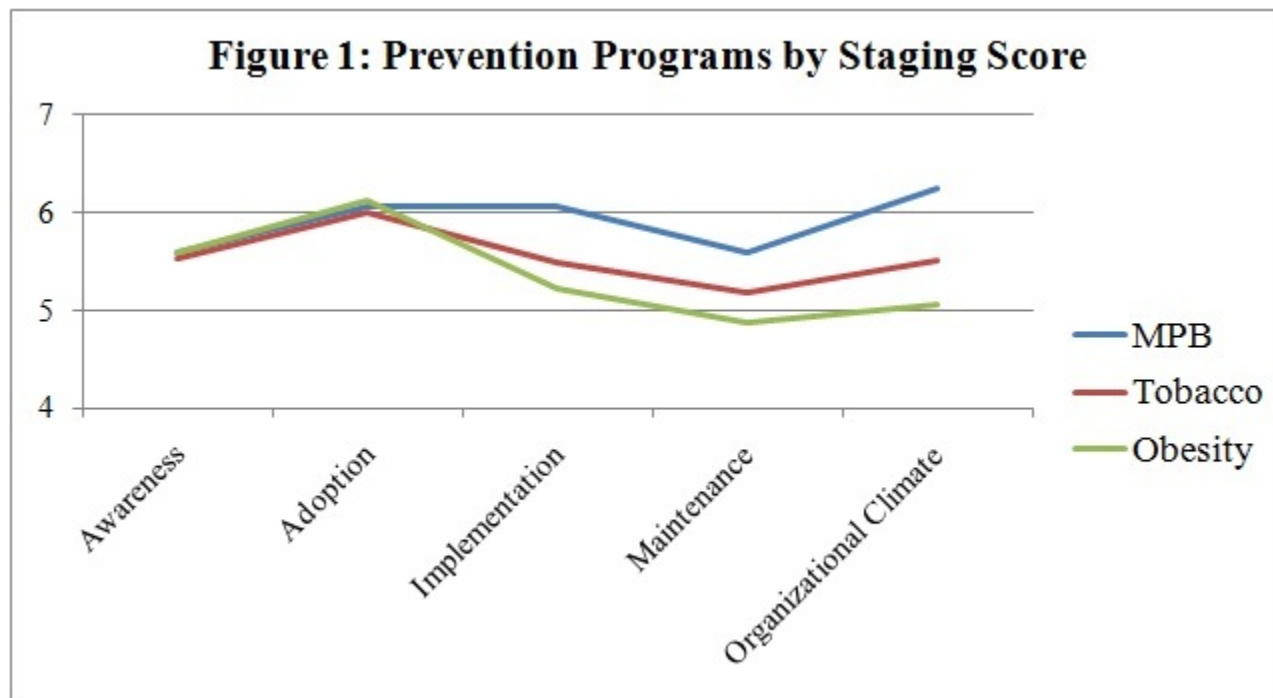
In the Awareness and Adoption components, there was no significant difference between the mean scores of tobacco and obesity programs or the MPB grantees. Descriptive results showed that the obesity prevention programs had significantly ( $p < .05$ ) lower mean scores than tobacco prevention programs in the Maintenance (4.9 compared to 5.2) and Organizational Climate (5.06 compared to 5.5) phases and significantly ( $p < .10$ ) lower mean score than tobacco in the Implementation (5.2 compared to 5.5) phase. MPB grantees scored significantly higher ( $p < .05$ ) than other obesity and tobacco programs in the Implementation, Maintenance, and Organizational Climate phases. Figure 1 shows the staging patterns by type of prevention program.

### Conclusions:

Obesity prevention programs (non-MPB) scored lower on the staging survey than tobacco prevention programs. This is likely due to the fact that in general, obesity prevention programs are still developing and building an effective evidence base and institutional support. However, one promising result is that those programs that had broad support from the MFH scored consistently higher than other programs. This may be due to the technical assistance provided to MPB grantees. Efforts and resources should be directed towards providing promising, evidence-based interventions with dissemination assistance in order to make inroads on the obesity epidemic.

### Support:

Financial support was provided by the Missouri Foundation for Health's Healthy & Active Communities Grant as well as the CDC's Prevention Research Center.





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### 18) Perceptions of the School Physical Activity Environment among Middle School Girls: Are Perceptions Related to Body Composition and Physical Activity?

*Erin Hager, PhD, Dawn Witherspoon, PhD, Robyn Foreman, MHS, RD, Maureen Black, PhD*

*Pediatrics, University of Maryland School of Medicine*

#### **Background:**

Adolescent girls' perceptions of physical activity promoting aspects of the neighborhood environment have been associated with healthy body composition and physical activity. Perceptions of the school physical activity environment may also be associated with the health of adolescent girls; however a tool has not been developed to assess perceptions of the school physical activity environment.

#### **Objectives:**

(1) To develop a questionnaire to assess middle school girls' perception of the school physical activity environment and (2) to determine the relationship between perceptions and objectively measured physical activity and body composition among adolescent girls attending predominantly low-income, African American, urban public middle schools.

#### **Methods:**

- (1) Questionnaire Development: A 24-item questionnaire (called SPAEP, School Physical Activity Environment Perceptions) was developed based on existing questionnaires and a focus group with 6<sup>th</sup> and 7<sup>th</sup> grade girls. The questionnaire was administered to 82 6<sup>th</sup> and 7<sup>th</sup> grade girls at 2 timepoints, one week apart. Through a factor analysis using varimax rotation, the questionnaire was reduced and the test-retest reliability and percent agreement (with a tolerance of 1 for each likert scale) was calculated.
- (2) Associations with Physical Activity and Body Composition: A sample of 116 6<sup>th</sup> and 7<sup>th</sup> grade girls from 4 urban middle schools completed the SPEAP as part of the baseline evaluation for an obesity prevention trial. Physical activity was assessed with the Actical accelerometer (Phillips Respironics, Inc.) placed on the ankle and worn for >7 consecutive days. The first and last days of data were truncated and up to 7 full days of data were retained. Body composition was assessed by calculating BMI-for-age percentiles from height and weight measured in triplicate and body fat % measured through bioelectrical impedance analysis (TANITA). Pearson's correlations were used to determine bivariate relationships. Multiple regression analyses were conducted to determine if relationships persisted when controlling for covariates. T-tests and ANOVAs were used to determine if perceptions differed by grade or school, and, if so, moderating effects of grade and school were explored.

#### **Results:**

- (1) Questionnaire Development: Through a factor analysis, the SPAEP questionnaire was reduced to 13 items and 3 subscales were identified: (1) Social Norms, (2) School Policies, and (3) Physical Education. The test-retest reliability of the SPEAP was 0.801 ( $p < 0.001$ ) and the % agreement was 81.9%, 73.2%, and 89.1% for each subscale, respectively.
- (2) Associations with Physical Activity and Body Composition: The sample consisted of 116 6<sup>th</sup> grade (54.3%) and 7<sup>th</sup> grade (45.7%) girls, ages 11-14 years (mean age=11.8). Nearly half of



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the girls were overweight or obese (45.7%) and the mean body fat % was 28.6% (SD=9.6). Valid physical activity data was obtained from 87.1% of the girls with an average of 6 days of valid data (range 2-7). The girls spent average of 16% of their time in moderate-vigorous activity with mean activity counts/ day =  $3.45 \pm 9.0$ . Bivariate analyses revealed no relationship between physical activity or body composition and the Physical Education and Social Norms subscales of the SPAEP. Overweight/obese girls were more likely to endorse the perception of school policies that promote physical activity ( $r=-0.19$ ,  $p=0.050$ ). This relationship no longer existed when controlling for covariates (grade, physical activity) in a regression model. Sixth grade girls endorsed a greater perception of physical activity promoting policies ( $t=2.01$ ,  $p=0.047$ ) and endorsed the perception of less social support for physical activity within the school ( $t=-2.68$ ,  $p=0.008$ ) compared to 7<sup>th</sup> grade girls. Mean responses for the Physical Education subscale differed by school ( $F=2.73$ ,  $p=0.049$ ). Moderating effects of grade and school were explored and did not yield a significant interaction.

### **Conclusions:**

A questionnaire assessing the perceptions of the school physical activity environment for middle school girls was systematically developed and evaluated. Significant relationships were not identified between perceptions of the school environment and objectively measured physical activity and body composition. Perceptions of the school environment differed by grade and school. Sixth graders had more positive perceptions of school policies that promote physical activity and less positive perceptions of social promotion of physical activity. Only middle schools (grades 6-8) were used in this study. Differences in perception by grade may differ in a school with multiple grades (i.e.: Kindergarten-8<sup>th</sup> grade). Future studies should examine the accuracy of the perceptions of the school physical activity environment of middle school girls to determine the relationship between reality, accuracy, perception and the health of middle school girls.

### **Support:**

RWJF ALR/New Connections Grant #65631 and NIH R01HD054727



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### 19) The Land Use around Urban Public Middle Schools is Associated with Physical Activity among Low-Income African American Adolescent Girls

*Erin Hager, PhD, Robyn Foreman, MHS, RD, Karen Wohlheiter, MS, Dawn Witherspoon, PhD, Maureen Black, PhD*

*Pediatrics, University of Maryland School of Medicine*

#### **Background:**

Neighborhood walkability has been associated with physical activity of children and adolescents when using the home as the central unit for assessing the environment. Factors influencing neighborhood walkability include connectivity of sidewalks, access to parks/open space, mixed land use (commercial and residential), and neighborhood aesthetics. Low-income, urban, African American adolescent girls experience very low rates of physical activity and high rates of obesity, demonstrating the urgency of identifying influences on their physical activity. The relationship between the walkability of the environment surrounding urban public schools serving predominantly low-income African American families and the physical activity of female middle school students has not been explored.

#### **Objectives:**

To determine the association between the walkability (emphasizing mixed land use) of the environment surrounding urban public middle schools serving predominantly low-income African American families and the difference in physical activity of female students between schools. We hypothesized that schools surrounded by parks, recreational facilities and commercial shopping areas will have a higher mean level of physical activity compared to schools surrounded by primarily residential areas.

#### **Methods:**

Four urban public middle schools in the same city and located >1 mile from each other participated. The walkability of the environment around each school was evaluated using a modified version of the St. Louis Audit Tool (Brownson, 2004), conducted in a car with a driver and three trained auditors. They surveyed 16 segments (¼ mile each)/school, extending ½ mile from the school in a 4x4 grid pattern. Constructs included: (1) mixed land use, (2) quality of environment for pedestrians, and (3) street connectivity/ bicycle friendly. We are reporting the results from mixed land use, summarized as proportion of observations/school and proportion of observations/segment/school. Within the four schools, 6<sup>th</sup> and 7<sup>th</sup> grade girls were recruited to participate in an obesity prevention trial. Baseline measures were used in this analysis. Physical activity was measured with the Actical accelerometer (Phillips Respironics, Inc.) placed on the ankle for >7 consecutive days (first and last days of data were truncated, up to 7 full days of data were retained). Activity data were summarized using percent time in moderate-vigorous physical activity. Physical activity differences were examined using ANOVA with post-hoc analyses and ANCOVA controlling for body composition (calculated BMI-for-age percentiles from height and weight measured in triplicate) and grade (6<sup>th</sup> or 7<sup>th</sup>). Differences in mixed land use by school were examined using Chi-square analyses and ANOVA.

#### **Results:**

Within the 4 schools, 116 6<sup>th</sup> and 7<sup>th</sup> grade girls participated; 87.1% had valid physical activity data, with an average of 6 days of valid data (range 2-7). The girls spent average of 16% of their time in



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moderate-vigorous activity. There was no difference in overweight/obesity or BMI-for-age percentile between schools. ANCOVA results revealed a significant difference in physical activity between schools when controlling for body composition and grade ( $F=3.69$ ,  $p=0.015$ , effect size=0.32). Post-hoc testing revealed that the physical activity within schools A&C was significantly higher than schools B&D (mean difference: 2.3-2.9%,  $p=0.002-0.062$  using LSD analysis). Several key differences in land use were identified between schools A&C versus schools B&D. Schools with higher physical activity among female middle school students (schools A&C) also had a greater proportion of segments with large office buildings ( $p<0.001$ ), corner stores ( $p=0.001$ ), and locally owned fast food restaurants ( $p=0.011$ ). Schools A&C also had a greater number of total food sources surrounding each school ( $F=8.49$ ,  $p<0.001$ ). No differences were observed when examining proportion of segments with recreational facilities, parks, or open space.

### **Conclusions:**

A difference in the physical activity of adolescent females between four urban public middle schools serving predominantly low-income African American families was detected (controlling for body composition and grade). The schools with greater physical activity had a greater proportion of commercial shopping areas, supporting part of our hypothesis. We had also hypothesized that the schools with greater activity would have a greater proportion of parks and recreational facilities, which was not supported by this analysis. Using the school as the central unit for assessing the relationship between the built environment and physical activity among children is a unique approach and has important implications, particularly in urban areas where many children walk to and from school. Although prevalence of overweight/obesity did not differ by school, the finding that schools with more active middle schoolers were near a greater prevalence of food sources lead us to speculate that students may be walking to purchase food from corner stores and fast food restaurants during the school year, increasing physical activity but also perhaps increasing consumption of high fat, high calorie foods. Future studies should explore the context of the activity of low-income, urban, African American adolescent girls, a population at high risk for inactivity and obesity, to determine how these girls interact with their environment to develop programs to promote activity and a healthy lifestyle.

### **Support:**

RWJF ALR/New Connections Grant #65631 and NIH R01HD05472



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### 20) Characterizing the Active Transportation Environment for Asian, Native Hawaiian and Pacific Islander Schoolchildren in Hawaii

*Katie Heinrich, PhD<sup>1</sup>, Daniel Alexander, BA<sup>2</sup>, Ann Peterson, MS<sup>3</sup>, Laura Dierenfield, AB<sup>3</sup>, Marcia Prose, BA<sup>3</sup>*

*<sup>1</sup>Public Health Sciences, University of Hawaii, <sup>2</sup>Urban and Regional Planning, University of Hawaii, <sup>3</sup>PATH, People's Advocacy for Trails Hawaii*

#### **Background:**

Safety concerns, missing infrastructure, unsupportive school environments and policies at multiple levels all affect rates of walking and bicycling to school. Children who walk or bicycle to school are more physically active than children who do not - a critical factor when addressing populations with high rates of obesity such as Asian and Pacific Islander and low-income children. Through cooperation and collaboration between multiple partners, Safe Routes to School (SRTS) programs can increase the number of students choosing active means of transportation. Efforts can address the childhood obesity epidemic through programmatic, environmental and policy approaches.

In 2009, new state laws for SRTS and complete streets (those that accommodate all modes of transportation) were passed and pedestrian and bicyclist planning initiatives were launched in Hawaii. In order to capitalize on the expected momentum for pedestrian and bicyclist issues, People's Advocacy for Trails Hawaii (PATH; an advocacy organization) contacted the University of Hawaii, and the County of Hawaii Planning Department to develop a joint, rapid response project: Hawaii's Opportunity for Active Living Advancement (HO'ALA).

#### **Objectives:**

The purpose of this abstract is to describe and provide baseline data for HO'ALA.

#### **Methods:**

This one-year quasi-experimental study included 8 intervention and 5 comparison schools across Hawaii County. Inclusion criteria required 35% or more students who received free or reduced lunch (a low-income proxy), being rural (60% live within 1 mile) schools, and willingness to fulfill study requirements. All schools had between 40-90% Asian/Native Hawaiian/Other Pacific Islander youth ages 5-11. Enrollments ranged from 128-850 students with 35.9-93.5% receiving free or reduced lunch.

Pre-test measures included student travel tallies in grades 1 and 4, school-wide parental surveys, traffic counts and safety observations at arrival and dismissal, and a principal's survey of policies and facilities. Direct observations of street segments around each school utilized the Pedestrian Environment Data Scan (PEDS).

PATH provided a "mini-grant" to each participating school and hired and trained community data collectors and two project coordinators for East and West Hawaii. Meetings were held with county officials to establish protocols for tracking infrastructure changes around each school. HO'ALA staff members attended planning meetings for the policies and planning initiatives.

#### **Results:**

[To date, baseline data were available for 8 intervention and 3 comparison schools.] Student travel



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tallies were completed in 40 classrooms for the intervention (mean=22.65, range=11-32 students per class) and 12 classrooms in the comparison schools (mean=18.83, range=14-21 students per class). Rates of walking were comparable, averaging 2 or fewer students per classroom, as were rates of bicycling, averaging 1 or fewer students per classroom. The majority of students reported riding in their family vehicle; averaging 14.8 students per classroom at intervention and 12.9 at comparison schools.

Parents completed 967 surveys at intervention and 416 surveys at comparison schools, with response rates from 13.1-58.4%. Over 50% of intervention parents lived >2 miles from school, while only 36.2% of comparison did. However, significantly more parents from comparison reported driving their children to school (84.5% versus 66.5%), while more intervention children rode the bus (27.0% versus 4.3%). Rates of bicycling to school were similar (60% of segments had no marked crosswalks for all schools. Comparison segments had more traffic control devices (e.g., stop signs; 59.8% versus 39.4%) and crossing aids (e.g., pedestrian signal; 26.2% versus 17.0%). Bicycle facilities were only found on 10 segments (4.1%) for intervention and 6 segments (4.9%) for comparison schools.

### **Conclusions:**

Problems for Hawaii were similar to other states, with low rates of active transportation. As SRTS programs are implemented in the next phase of this project, it is important to address traffic problems and missing infrastructure in order to increase walking and biking to school by low-income, Asian/Native Hawaiian/Pacific Islander children in Hawaii County. Project collaborations will help utilize these results to move forward necessary changes in programming, policies, and the physical environment.

### **Support:**

Robert Wood Johnson Foundation funded this project through Active Living Research, Round 9-Rapid Response.



### 21) An Examination of the Association between Factors of the Built Environment within School Neighbourhoods and High and Low Active Male and Female Adolescents in High and Low Risk Environments

*Erin Hobin, MA<sup>1</sup>, Scott Leatherdale, PhD<sup>2,3</sup>, Steve Manske, PhD<sup>2</sup>*

*<sup>1</sup>Health Studies and Gerontology, University of Waterloo, <sup>2</sup>Youth Health, Propel Centre for Population Health Impact, <sup>3</sup>Division of Preventive Oncology, Cancer Care Ontario*

#### **Background:**

Physical inactivity is a dominant public health concern in most countries worldwide and the most prevalent risk factor for chronic disease in children and adolescents. There is a strong tendency for physical activity (PA) levels to be lower among girls (vs. boys) and persons of lower socioeconomic status (SES). One possible explanation for these patterns involves differential exposure to neighbourhood environments supporting PA. The environment on school grounds and within the school neighbourhood can play an important role in providing all youth with opportunities to engage in PA. With the goal of identifying promising approaches for reducing PA disparities among youth, it is critical to understand how characteristics of the built environment of schools correlate with PA. Although previous studies have reviewed research on this topic in general, this research is distinctive because of its direct relevance to inactive youth, youth living in low SES neighbourhoods, and the interplay of inactive youth living in low SES neighbourhoods.

#### **Objectives:**

To better understand how PA disparities might relate to factors of the built environment of schools, the objectives are to:

- examine the extent to which the four groups exist for boys and girls (1. high active youth-high SES neighbourhood, 2. high active youth-low SES neighbourhood, 3. low active youth-high SES neighbourhood, 4. low active youth-low SES neighbourhood);
- identify which factors of the built environment on school grounds and within school neighbourhoods are associated with being in one of the four groups for boys and girls; and,
- determine if factors of the built environment on school grounds and within school neighbourhoods are distributed in ways that differentially expose the four groups to environments more or less supportive of PA.

#### **Methods:**

This cross-sectional study used self-reported school- and student-level data from administrators and grades 9-12 students (n=25,060) at 76 high schools across Ontario, Canada. Students' PA levels, sex, grade, the number of PE classes per week, and participation in interschool and intramural activities were linked to school environment data indicating the availability and number of PA-related facilities (e.g., running track, soccer field) on school grounds. Using school postal codes and the 2006 Canadian census data, an area-based measure of SES was determined by the percentage of families living below the low income cutoff for each school neighbourhood. To capture the potential effects of school neighbourhood, PA-related facilities and neighbourhood design characteristics within 1km buffers of participating schools were mapped using GIS. Sex-specific logistic regression analyses were performed to examine how factors of the built environment on school grounds and within school neighbourhoods are associated with being: 1. high active youth-high SES neighbourhood, 2. high active youth-low SES neighbourhood, 3. low



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active youth-high SES neighbourhood, 4. low active youth-low SES neighbourhood. To maximize the impact of this research, meetings with decision-makers from the Ontario public health regions serving Ontario schools and stakeholders from the Heart and Stroke Foundation were conducted to discuss and refine the proposed research design and analysis. As the project progresses, follow-up meetings are scheduled with these groups to interpret findings and determine best practice strategies for dissemination and implementation of the results.

### **Results:**

A total of 3,609 students could be classified into 1 of the 4 categories being examined, and significant sex differences among groups existed. Further analyses to identify specific built environment factors and the distribution of these factors on school grounds and within school neighbourhoods that may account for boys and girls being in one of the four groups will be completed.

### **Conclusions:**

Tackling PA disparities between boys and girls by socioeconomic background has been recognized as a key goal for governments internationally. A better understanding of which subgroups of youth benefit from the built environment may help us to anticipate the effects of changing or even studying it; yet, few existing examinations have considered the built environment-PA relationship by gender and SES among youth. Separate description and analysis is needed because both the magnitude and the factors influencing observed social inequities in PA can be different for boys and girls. It is therefore of critical importance that these differences are known and taken into consideration when developing strategies to combat inequities in PA.



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### 22) Built Environment Associations with Physical Activity, Active Commuting, Sedentary Behavior, and Body Mass Index among Hispanic Americans in Three Rural Communities

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*Department of Kinesiology, Kansas State University*

#### **Background:**

Persons from Hispanic backgrounds represent a fast-growing segment of the U.S. population (Pescatello et al., 2008). Compared to Caucasians, Hispanics have lower levels of physical activity and higher rates of obesity and several chronic diseases (Ogden et al., 2006; Office of Minority Health, 2007). However, despite the documented importance of the built environment, relatively little research has examined how neighborhood attributes are associated with physical activity or other health behaviors or outcomes among Hispanics (Saelens & Handy, 2008; see Rutt & Coleman, 2005 for an exception).

#### **Objectives:**

The purpose of this study was to examine associations between perceptions of the built environment and physical activity, active commuting, sedentary behavior, and body mass index among Hispanic adults in three rural communities.

#### **Methods:**

This study, part of a broader Hispanic Health Needs Assessment (National Alliance for Hispanic Health, 2004), occurred in three small cities in three rural southwest Kansas counties where the population was 40-50% Hispanic and growing rapidly. Questionnaires in Spanish and English were distributed to Hispanic adults (N=207) by community partners (e.g., local health clinics, ESL instructors, faith-based organizations).

Perceptions of the neighborhood environment were measured using 10 of the 11 core/recommended items in the IPAQ-environmental module (Sallis et al., 2009) as well as one additional item asking about the presence of a safe park in the neighborhood. Similar to previous research (Bengoechea et al., 2005; Mota et al., 2005; Sallis et al., 2009), responses to the 4-point scale for each item were dichotomized as disagree (1-2) or agree (3-4).

Participants were dichotomized as meeting or not meeting physical activity recommendations (mod+vig>150 min or vig>75 min) using the BRFSS measure of moderate and vigorous activity. For active commuting, respondents reported the number of days per week they walked or biked to work, which was dichotomized as none (0 days) vs. some (1-7 days). For sedentary behavior, participants were categorized as 'high' if they reported 1-3 hours/day or more for both 'TV/videos/video games' and 'computer use'. Finally, body mass index was calculated using self-reported height and weight [ $\text{weight}(\text{kg})/\text{height}(\text{m})^2$ ], and participants were grouped into two categories: under/normal weight (<25) and overweight/obese (>25).

Logistic regression (controlling for gender, age, education, children in household, and community of residence) was conducted to examine the odds, when participants agreed with each neighborhood variable, of a) meeting physical activity recommendations, b) active commuting at least once per week, c) engaging in a higher amount of sedentary behavior, and d) being overweight/obese



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### Results:

Participants were 69% female, 51% were over the age of 30, 56% were married, 45% were high school graduates, and 84% had children in the household. Just over half of participants (56%) reported meeting physical activity recommendations, 43% actively commuted at least once per week, 61% reported a higher level of sedentary behavior, and 61% were overweight or obese. Presence of sidewalks ( $B=2.75$ ,  $OR=1.22-6.21$ ) and the presence of a safe park ( $B=2.38$ ,  $OR=1.64-3.99$ ) were related to increased odds of meeting physical activity recommendations, while perceiving a high crime rate was related to lower odds of meeting recommendations ( $B=0.46$ ,  $OR=0.20-0.93$ ).

Residential density ( $B=3.05$ ,  $OR=1.29-7.22$ ) and having shops nearby ( $B=2.80$ ,  $OR=1.33-5.88$ ) were both associated with an increased likelihood of at least some active commuting. Several variables were associated with a reduced likelihood of engaging in higher levels of sedentary behavior. Specifically, having a bus stop within walking distance ( $B=0.30$ ,  $OR=0.15-0.60$ ), bike facilities nearby ( $B=0.33$ ,  $OR=0.15-0.74$ ), and a safe park in the neighborhood ( $B=0.64$ ,  $OR=0.35-0.94$ ), as well as seeing people being active ( $B=0.42$ ,  $OR=0.18-0.98$ ) and having interesting things to look at while walking in the neighborhood ( $B=0.33$ ,  $OR=0.16-0.70$ ) were all inversely associated with sedentary behavior.

Finally, seeing people being active was, surprisingly, associated with increased odds of being overweight/obese ( $B=2.87$ ,  $OR=1.29-6.41$ ).

### Conclusions:

Hispanics comprise an increasingly large proportion of the U.S. population and its health expenditures. Our findings within this ethnic group are consistent with past research showing that several variables in the built environment are related to active and sedentary behaviors (Saelens & Handy, 2008; Sugiyama et al., 2007). Unfortunately, minority communities often suffer from deprivation amplification (Macintyre, 2008) in that they lack both personal and environmental supports for physical activity and health (Trost et al., 2002; Taylor et al., 2006). Our study contributes to the knowledge base necessary to support neighborhood and community improvements that may ultimately reduce health disparities. Future research should further explore these associations using objective measures of environmental and outcome variables; examine the effects of environmental interventions in minority communities; and consider the role of ethnicity as a moderator of the relationship between the built environment and health behaviors.

### Support:

This study was supported by the Sunflower Foundation of Kansas.



### 23) Concurrent Validity of Accelerometry and the Observation System for Recording Physical Activity in Children - Preschool

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#### Background:

Toward stemming the rise in childhood obesity, researchers are increasingly targeting increased physical activity (PA) in very young children (i.e., 3-5 y). Interventions aimed at this age group are few but growing in number and have typically focused on evaluating changes in equipment, staff development, programs, and policies. Rarer are evaluations of how permanent changes in physical topography affect PA. Measuring PA in this age group differs from other age groups, in part due to incapacity to self-report PA. Immature motor skills and short/transient episodes characterize PA intensity and duration, respectively. Metrics that are sensitive to these characteristics are required for accurate PA measurement. To date, accelerometry, systematic observation, and pedometry have been most frequently used to directly quantify PA in preschool children. There is, however, equivocal evidence concerning the equality of methods. Specifically, accelerometer count thresholds and epoch lengths have been recently questioned in light of resultant overestimation of no- and light PA compared to systematic observation using the Children's Activity Rating Scale (Oliver et al., 2010).

#### Objectives:

In conjunction with evaluating the effects on PA of the redesign and repurposing of an existing outdoor preschool play space, we assessed the concurrent validity of measuring PA with accelerometers and a newer systematic observation instrument - the Observation System for Recording Physical Activity in Children - Preschool (OSRAC-P; Brown et al., 2006). The OSRAC-P includes observational categories that assess PA type and context, social interaction, and location that are not afforded by accelerometry alone.

#### Methods:

Children ( $n=57$ ; 32 girls; age,  $M=56.9\pm 4.0$  months; 84% normal weight) attending a university preschool were observed during 20-minute recess periods while wearing an Actigraph GT3X accelerometer set for 15-s recording epochs. A total of 140 paired observation-accelerometer recordings were collected over an 8-month period. Accelerometer data were converted to percentages of time spent in sedentary, light, moderate, and vigorous PA according to published cutpoints (Sirard et al., 2005). Observation (5-s observe, 25-s record intervals) data were converted to percentages of time spent in the same four intensity categories. Interrater reliability for PA level on the OSRAC-P was assessed 15 times during latter stages of observer training ( $M=86.4\%$   $SD=5.5\%$ ) and the data collection phase ( $M=84.3\%$ ,  $SD=3.7\%$ ). Concurrent validity was assessed using two proportion z-tests and Bland Altman plots.

#### Results:

PA intensities ( $\% \pm 95\% CI$   $O=OSRAC-P$ ,  $A=accelerometer$ ) included: sedentary ( $57.8\pm 8.2_O$ ;  $65.9\pm 7.8_A$ ;  $Z=1.40$ ,  $p=.163$ ), light ( $27.9\pm 7.4_O$ ;  $25.1\pm 8.2_A$ ;  $Z=-0.53$ ,  $p=.596$ ), moderate ( $11.1\pm 5.2_O$ ;  $6.8\pm 4.1_A$ ;  $Z=-1.26$ ,  $p=.208$ ), and vigorous ( $3.3\pm 2.9_O$ ;  $2.2\pm 2.5_A$ ;  $Z=-.563$ ,  $p=.574$ ). Overlap of confidence intervals indicated that the two methods were not statistically different for estimating PA intensity although



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light- and vigorous-intensity categories appeared more concordant than moderate-intensity and sedentary categories. Bland Altman differences (%O - %A) and limits of agreement were: sedentary ( $-.095 \pm .306$ ), light ( $.038 \pm .254$ ), moderate ( $.048 \pm .143$ ), and vigorous ( $.010 \pm .137$ ). Equivalence of measures based on interpretation of Bland Altman plots requires that three criteria are met: (1) the average discrepancy between methods is clinically small; (2) the difference between methods does not tend to change as the average increases; and (3) the scatter around the bias line remains constant as the average gets higher. Intensity categories met these criteria in the following manner: sedentary (criterion 2), light (criteria 1-3), moderate (criterion 1), and vigorous (criterion 1).

### **Conclusions:**

Both objective measures have limitations, and though it is not possible to determine which is more accurate, the present study suggests potential improvements in methods. The OSRAC-P employs a 5-s sampling interval, which may be more sensitive at detecting higher-intensity PA than accelerometry, which by comparison samples over 15-s epochs. Additionally, some activity types listed on the OSRAC-P (e.g., climbing, riding) cannot be as readily detected by accelerometry. Since the OSRAC-P was originally designed to capture only 10-s of PA during each 1-min of observation, a sizeable duration of PA is not coded. Yet the instrument's long recording interval allows decisions to be made about intensity level, type, context, location, initiator, and group composition, which can be used to better understand variables associated with PA intensity that accelerometry alone cannot provide. The short bursts involved and variety of very young children's movement necessitate refinement in the measurement of PA. For accelerometry, activity count cutpoints could be developed for shorter epoch durations, and for the OSRAC-P the latency between successive observation intervals could be shortened if adequate levels of reliability are retained. (This may require deletion of several OSRAC-P categories depending on the variables of interest in a particular study.)

### **Support:**

This study was partially funded by the California Association of Health, Physical Education, Recreation & Dance Foundation for the Promotion of Healthy Lifestyles.

### 24) The Impact of Urban Environment on Physical Active Travel Behavior in Deprived Neighborhoods

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*Urban Planning, Eindhoven University of Technology*

#### **Background:**

One of the major problems in public health, not just in the Netherlands, but worldwide, is that of being overweight and obesity. In the Netherlands, the proportion of overweight people has increased from a third to a half over the last 25 years. 10% of overweight persons are obese. This is mainly caused by on the one hand an increased consumption of more energy-dense food and on the other hand a decreasing level of physical activity. Active transportation modes as walking and bicycling have been suggested as an important source of physical activity for all people. Increasingly, links are being identified between various elements of the built environment and physical activity such as walking and bicycling. These studies stated that understanding the neighborhood context is important for developing effective interventions that promote physical activity.

In the Netherlands, 40 neighborhoods are identified by the Dutch national government as those neighborhoods that suffer most from problems of low livability. People living in these deprived neighborhoods in general have a lower socio-economic status, a shorter life expectancy, and are less healthy than people living in other neighborhoods. Individuals who reside in lower socioeconomic status neighborhoods may have little ability to control their physical activity because they in general have fewer and less accessible physical activity resources.

#### **Objectives:**

As the 40 deprived neighborhoods in the Netherlands will be renovated and restructured in the coming years, the question rises what the impact is of the urban environment on participation in physical activity. Therefore, the aim of this study is to examine the relation between urban environmental characteristics and the participation in physical active transport modes, such as walking and bicycling, by people living in deprived neighborhoods. The findings may provide urban planners and local government information about how to improve the structure and design of the deprived neighborhoods in order to contribute to the stimulation of active transportation and health of their residents.

#### **Methods:**

For this study two types of data were used. Firstly, individual travel diary data (MON-data, Mobility Research Netherlands) collected by the Ministry of Transport, Public Works, and Water Management, and secondly data on housing and environmental conditions in the Netherlands (Housing Survey) collected by the Ministry of Housing, Spatial Planning and the Environment in 2006 were used. From these databases information from 2696 respondents living in the 40 deprived neighborhoods and 40 comparable neighborhoods (in terms of socio-demographic characteristics) was selected.

In the analyses both variables at the individual and neighborhood level were included. Therefore, a so-called multilevel analysis was used. This is an advanced form of standard multiple regression analysis, where the hierarchical structure of the data is taken into account. In the analyses all

physical activity, measured as the travel time by the active transport modes walking and bicycling for all daily activities by the respondents was investigated. Variables regarding the urban environment like land use, degree of urbanization, connectivity, social cohesion, degeneration, safety level, rating of green, average perceived health, and percentages of ethnicity at the neighborhood level were included as explanatory variables at the higher level. At the lower level, individual and household socio-demographics, such as age, gender, household type, car/bike possession, income, education level, and working status were included in the analyses. The data are merged by the four digit postal code.

### **Results:**

The Multi-level analysis revealed that there is one spatial variable in particular that, according to what could be expected, has a significant positive influence; that is, urban density. With an increase of urban density, the travel time by bike increases as well as the total time travelled by bike or on foot. Furthermore, mixed land-use, degeneration, safety and rating of green influence travel time by bike / on foot. Ratings on social cohesion and health also appear to have some positive impact. Analysis of personal characteristics shows that these characteristics have impacts that are in line with expectations. Persons from multiple person households (with or without children) are less physically active than persons from single-person households or from single-parent households with children. Also education level has a positive impact on walking and biking. Finally, car possession appears to have a negative influence on walking: the more cars available in the household the less walking takes place.

### **Conclusions:**

To what extent and in what way, then, can urban design and policies promote physical active modes of travelling and contribute positively to public health, specifically in the deprived neighborhoods? The results of our study suggest that all in all the influence of spatial variables is limited. However, quality of green, social cohesion, mixed land-use and safety are variables that may provide a key.





### 25) How Does Community Park Use Vary by Park User Characteristics?

**Sandra Lapham, MD, MPH, FASAM<sup>1</sup>, Deborah Cohen, MD, MPH<sup>2</sup>, Stephanie Williamson, BA<sup>3</sup>, Kelly Evenson, PhD<sup>4</sup>, Phil Ward, PhD<sup>5</sup>, Amy Hillier, PhD<sup>6</sup>, Thomas McKenzie, PhD<sup>7</sup>**

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#### **Background:**

People visit U.S. community parks for different reasons. Some go to use the built facilities (e.g., playgrounds, basketball courts, soccer fields). Others go to relax, meet friends, picnic, or simply hang out. While activities at the park are determined primarily by park features (i.e., facilities and amenities), little systematic research has been conducted to evaluate how the use of public parks varies by park user characteristics.

#### **Objectives:**

We conducted surveys of park users in 5 cities to determine how park use varies by gender, age, and ethnicity.

#### **Methods:**

We surveyed 2,497 adult park users in 26 neighborhood parks located in 5 U.S. cities: Albuquerque, New Mexico; Chapel Hill, North Carolina; Columbus Ohio; Los Angeles California, and Philadelphia, Pennsylvania. Staff visited each park during daylight hours, systematically selected park users, and asked them to anonymously answer questions including how often they visited the park, whether they typically went alone or with others, the degree to which they felt safe in the park, and their usual activities at the park. We used descriptive and multivariate statistics to determine whether there were differences in park use and activities by gender, age group (18-25, 26-35, 36-45, 46+), and ethnicity/race (ethnicity) [Non-Hispanic white (NHW), Hispanic, African American, and other]. Multivariate models were used to control for effects potentially related to park characteristics and population differences in the various cities. Reference groups for these analyses were male gender, age 36-45, and NHW ethnicity.

#### **Results:**

Ohio and Pennsylvania parks had the highest representation of African Americans; California and New Mexico had the highest proportions of Hispanic respondents. More females were interviewed than males, constituting 54% of those surveyed. The mean age of respondents was 39 years (median = 36 years), and the majority were NHW (52%), with African Americans representing 26%, Hispanics 14% and other ethnicities comprising 8% of the sample. Logistic regression analyses revealed that those in the oldest age group (46+) were more likely than the reference group to visit the park at least weekly. They, along with the youngest age group (18-25), were more likely to go alone. In contrast, Hispanics and women were less likely than reference groups (NHWs and males, respectively) to go alone to the park. Hispanics, African Americans, and women were significantly less likely than the reference groups to view the park as 'very safe' or 'safe.'



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A higher proportion of women (20%) than men (10%) reported they did not exercise ( $p < 0.0001$ ). There were no significant age or ethnic differences in reporting regular exercise. Females were less likely to report exercising regularly, and those aged 46+ and Hispanics were more likely, to report getting their regular exercise in the park, compared with the reference groups. Types of activities performed in the park differed by gender, age group, and ethnicity. Women's activities in the park were more sedentary; they were much less likely than men to play team sports (baseball basketball, soccer, tennis, volleyball, frisbee, handball), but engaged in individual sports and activities (skating, aerobics, gym activity, swimming running/jogging) at similar levels. Women were more likely to be involved in sedentary recreational activities (e.g., picnicking, meeting friends, relaxing, or spectating). The odds of women spending park time in sedentary activities was 1.6 (95% CI 1.3 - 2.0) compared to men. African Americans also reported more time spent in these sedentary activities compared to NHWs (odds ratio 1.6, 95% CI 1.3 - 2.0). There were no significant differences among groups participating in individual sports/activities, but persons aged 18-25 and 26-35, and African Americans, were more likely to participate in team sports than the reference groups. Walking was reported more often by those age 46 or older, and less often by African Americans and those of other ethnicities, compared with the reference groups.

### **Conclusions:**

Park use and activities varied among surveyed park visitors by gender, age, and ethnicity. Women were less involved in team sports, and tended more to participate in sedentary activities when visiting parks. Younger adult park visitors were more involved in team sports, whereas older visitors were more likely to walk for exercise. Differences also were apparent among ethnic groups. Generating information from park users is important because it can be used by park staff to 1) improve or alter facilities, or add programs to increase physical activities preferred by certain population subgroups; and 2) more effectively market parks to targeted populations.

### **Support:**

NHLBI # RO1HL092569



### 26) From a Youth-led Needs Assessment to a Health Campaign

**Susan Kim<sup>1</sup>, Lucy Tang<sup>1</sup>, John Tang<sup>1</sup>, Kevin Tang<sup>1</sup>, Michael Tang<sup>1</sup>, Lyna Truong<sup>1</sup>, Waising Wong<sup>1</sup>, Kevin Zhu<sup>1</sup>, Sissy Trinh, BA<sup>1</sup>, Sophia Cheng, BA<sup>1</sup>, Susan Hoang, MLIS<sup>1</sup>, Cevadne Lee, BA<sup>1,2</sup>**

<sup>1</sup>Youth Organizers, Southeast Asian Community Alliance, <sup>2</sup>School of Community & Global Health, Claremont Graduate University

#### **Background:**

A 2002 Los Angeles County Health Department survey indicated that 55% of the County's adult population was overweight or obese. Co-occurring with the high prevalence of overweight/obesity were diabetes, high blood pressure, and limited physical activity. While past studies have shown racial/ethnic differences in the prevalence of overweight/obesity and related illnesses, little research has been carried out with disaggregated health data for Asians and Latinos living in the Chinatown, Solano Canyon, and Lincoln Heights neighborhoods of Los Angeles County. Census 2000 found Chinatown's population was 69% Asian and 26% Hispanic, and Lincoln Heights was 24% Asian and 72% Hispanic (Solano Canyon is between Chinatown and Lincoln Heights, unseparated in Census). Anecdotally, community leaders in these communities have seen a demographic shift to include Chinese, Khmer, Vietnamese, and Latino immigrants bringing diversity, changing family-composition patterns, and lower economic status and, hence, the need to understand the health status of these communities. This exploratory study on neighborhood health was undertaken by youth organizers in the Southeast Asian Community Alliance (SEACA), a community organization that empowers Southeast Asian communities and others in leadership development, education, advocacy and community organizing.

#### **Objectives:**

For this study, we report on the development and results of a youth-led pilot needs assessment addressing the health status, physical activity, social support, environmental, and economic issues facing families living in Chinatown, Solano Canyon, and Lincoln Heights. Youth organizers led the process, utilized the data for planning a community health campaign to educate policymakers and health providers about community needs, and increased youth involvement in community advocacy.

#### **Methods:**

Convenience sampling was carried out in neighborhood clusters in Chinatown, Solano Canyon, and Lincoln Heights. The sample comprised 28 Chinese, 23 Mexicans, 8 Vietnamese, 3 other Latinos, and 3 Khmer between the ages of 14-86. Qualitative and quantitative methods including interviews and questionnaires were used. Questionnaires were used for adults from 18-86 years of age (n=69) and focus groups for youth from 14-17 (n=13) years of age. SEACA youth organizers led survey development and distribution and focus group facilitation. Youth organizers understood adults would be more comfortable completing a questionnaire instead of participating in a focus group led by youth. Youth organizers postulated that having youth participate in a focus group would provide more opportunity to share information in a comfortable group environment than would a questionnaire.

The adult questionnaire was translated into Vietnamese, Khmer, Spanish, and Chinese by bilingual staff and volunteers. Questions were tested for accuracy through interviews. Bilingual youth organizers and adult volunteers were available during survey collection. Youth organizers and adult supervisors approached households in Chinatown, Solano Canyon, and Lincoln Heights.



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Households were chosen based on convenience and safety of location. 35% of households invited agreed to participate in the survey. Informed consent was obtained prior to data collection. Focus groups were facilitated in English by SEACA youth in two high schools in Chinatown and Lincoln Heights. Youth organizers recruited focus group participants through flyer distribution at school and class announcements. Parental consent and youth assent were obtained prior to focus group participation.

### **Results:**

Adult survey (n=69) results showed that 16% of adults perceived themselves as obese or overweight; 10% self-reported they have diabetes; 41% expressed lack of time for regular exercise, and 78% exercised 0-2 times a week for at least 30 minutes. Both employed and unemployed participants reported that they lacked time to exercise. While adults felt safe in their neighborhoods to exercise, they reported lack of space and built environment hindrances to physical activity, and desired more exercise programs in their neighborhoods.

Youth focus group (n=13) participants voiced the same need as adult participants in wanting more exercise programs in their neighborhoods. However, in contrast to the adults, youth participants said they do not feel safe walking in their neighborhood in the evening due to reports of crime. Youth also reported feeling unsafe walking around their schools. Participants in both groups recommended that a solution to improving health was to eat healthier. Youth participants also suggested people should exercise (walk, ride bikes). Participants mentioned they would like to see more and participate in various activity-based programs in the community (cooking classes, fitness programs, sports).

### **Conclusions:**

The purpose of this study was to identify community perceptions of health problems and needed resources as a basis for a social justice campaign. Based on the results, SEACA has postulated that in addition to poor diet, built environment issues contribute heavily to less than optimal health outcomes. Heavy traffic, safety concerns at parks and on streets, poor nutrition, and lack of physical activity programs were all cited. As such, SEACA has been developing a culturally relevant campaign to address health and wellness issues through advocacy around the built environment.

### **Support:**

Funding for this research was obtained from the Network for a Healthy CA, the Dwight Stuart Youth Foundation, and the Jessie Smith Noyes Foundation to SEACA.



### 27) Gender Differences in the Social and Physical Contexts of Children's Sedentary Behaviors: An Ecological Momentary Assessment Study

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#### **Background:**

In children, sedentary behavior is emerging as an important component of obesity, and poses independent health threats and tracks into adulthood. Sedentary behavior should not be simply understood as the absence of physical activity. Depending on the purpose, sedentary behaviors can be either productive or leisure-oriented. Contrary to productive sedentary behaviors such as reading and doing homework, leisure-oriented sedentary behaviors such as watching TV have been associated with cardiovascular and metabolic risk factors. Moreover, sedentary behavior may moderate the relationship between physical activity and overweight among children. Therefore, levels of sedentary behavior should be considered when investigating factors associated with overweight and in the development of effective obesity prevention programs. In the past, measuring of sedentary behaviors was usually done by using multiple day activity recalls, and often did not distinguish between productive sedentary behaviors and leisure-time sedentary behaviors. Recall measures have limitations in accuracy of memories, especially for children. It is also difficult to assess social and physical contexts of children's sedentary behaviors by using traditional recall-based measures.

#### **Objectives:**

The present study used Ecological Momentary Assessment (EMA) methods to (1) describe where and with whom children are likely to engage in sedentary behaviors during the course of their everyday life and (2) determine whether there are gender and age differences in the physical and social contexts of sedentary behavior.

#### **Methods:**

Data from 121 children were collected through an HTC Shadow mobile phone (T-Mobile USA, Inc.) from Friday to Monday during their non-school time. Children's age ranged from 9 to 13, 52% of the children were boys, 38% were overweight or at risk for overweight, 32% were Hispanic, 24% were Caucasian, 12% were Asian and 10% were African American. Electronic surveys were prompted through the mobile phone 3-7 times per day (up to 20 times total) asking children's current activity (e.g., Watching TV/Movies, Playing video games, Reading/Homework, Active Play/Sports/Exercising, Eating/Drinking), physical context (e.g., Home, Someone else's home, Outdoor, Gym) and social context (e.g., Alone, Family members, Friends, Strangers). Chi-square tests were used to examine the differences of leisure-oriented and productive sedentary behaviors in physical and social contexts, as well as the effects of gender, age, and weight status.

#### **Results:**

Seventy-eight percent of all the prompted surveys were answered. Of the answered EMA prompts, sedentary behavior was reported as the main activity 39% of the time. Sixty-eight percent of the reported sedentary behaviors were leisure-oriented (watching TV/movies and playing video games) and 32% were productive (reading and doing homework). Children were more likely to engage in



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both leisure-oriented and productive sedentary behaviors when at home than at other places ( $\chi^2=11.6, p=.041$ ) and when with family members than when with friends or when alone ( $\chi^2=16.2, p<.001$ ). Overall, boys were more likely to engage in leisure-oriented sedentary behaviors, and girls were more likely to engage in productive sedentary behaviors ( $\chi^2=22.8, p<.001$ ). Boys were more likely to engage in leisure-oriented sedentary behaviors than girls when at home ( $\chi^2=10.9, p=.001$ ) and when with friends ( $\chi^2=4.9, p=.028$ ). Girls were more likely to engage in productive sedentary behaviors than boys when alone ( $\chi^2=5.1, p=.023$ ). Older girls (12-13 years of age) were more likely to engage in productive sedentary behaviors than younger girls (9-11 years of age,  $\chi^2=11.0, p=.001$ ). Overweight or at risk for overweight girls were more likely to engage in leisure-oriented sedentary behaviors than normal and underweight girls ( $\chi^2=7.4, p=.025$ ). No differences in patterns of sedentary behaviors were found between older boys and younger boys, and among boys of different weight status.

### **Conclusions:**

Children engaged in leisure-oriented sedentary behaviors more often than productive sedentary behaviors, which may pose a greater risk to overweight and obesity. Children were more likely to engage in sedentary behaviors when at home and when with their family members. When promoting physical activity among children, family-based intervention programs may work more efficient than targeting children alone. Since boys and girls exhibit different pattern in social and physical contexts of sedentary behaviors, future obesity prevention programs could have different emphasis based on gender.

### **Support:**

Active Living Research Rapid-Response grant #RWJF 65837 (Dunton, PI) and National Cancer Institute grant #R01-CA-123243 (Pentz, PI).



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### 28) Acculturation, Physical Activity, and Obesity among Mexican American Adolescents

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#### **Background:**

Mexican American children, the largest and fast growing ethnic minority group, are disproportionately affected by the epidemic of childhood obesity. Data on the influences of acculturation and immigration on obesity and physical activity among Mexican American adolescents are limited and inconclusive.

#### **Objectives:**

To investigate the associations of generation, language, and acculturation process with physical activity, screen time, and obesity in a nationally representative sample of Mexican American adolescents.

#### **Methods:**

Data came from the 1999-2004 National Health and Nutrition Examination Survey (NHANES) restricting to 2,270 Mexican American adolescents aged 12-19 years old. Participants were grouped according to their generational status (first, second, or third), and language preference at home (more Spanish vs. more English). Acculturation process was measured by the length of time residing in the US (<5, 5-9, ≥ 10 years) and a validated 5-item Short Acculturation Scale for Hispanics assessing the usual use of Spanish to read and speak, to think, as a child, at home, and with friends. We further categorized this acculturation scale into three groups (minimal use, some use, or only use of English). Based on the report of participating in more than 40 types of moderate to vigorous physical activity (MVPA) and its duration in the past month, we calculated the total metabolic equivalents (METs) minutes from MVPA per day. NHANES also asked about walking or biking as part of getting to and from school or to do errands and about doing muscle-strengthening exercises in the past 30 days. Screen time was assessed by the typical daily hours sitting and watching TV or videos, using a computer, or playing computer games in the past 30 days. Using the measured height and weight data, obesity was defined as gender- and age-specific body mass index values at or above the 95<sup>th</sup> percentile of the reference population. Analyses included logistic and linear regression models that adjusted for age, sex, parental education, household poverty, child health, in school status, and survey year.

**Results:** Compared to the first-generation Spanish speakers, the first-generation English speakers were more likely to report vigorous physical activity (adjusted odds ratios (AOR): 2.1, 95% confidence interval (CI): 1.3-3.6). The first-, second- and third-generation English speakers on average spent more METs minutes per day from MVPA (range: 98.1 to 131.7). Second- and third-generation English speakers were more likely to engage in muscle-strengthening exercises (AOR: 1.5, 1.7, respectively). The first-generation English speakers and second-generation children had higher odds of reporting walking or biking to and from school, however, the differences disappeared after adjusting for covariates. No significant difference in screen time was found by generation and language preference. Furthermore, the second- and third-generation adolescents had at least two times higher odds of being obese (AOR ranging from 2.0 to 2.8). The differences persist after



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additionally adjusting for physical activity variable. Similar patterns were also observed in physical activity and obesity when we used the Short Acculturation Scale measure. The adolescents who reported some use or only use English had higher odds of obesity, engaging more in muscle-strengthening exercises (AOR: 1.8, 1.3-2.7 for some English users, and AOR: 2.0, 1.2-3.4 for only English users), and spending more than 3 hours per day on screen activities (AOR: 1.8, 1.2-2.7 for only English users). Restricting to foreign-born Mexican American adolescents ( $n=652$ ), we found that residing in the US for more than 5 years was associated with the higher odds of engaging in muscle-strengthening exercises in the past 30 days compared to those living in the US for 5 years or less. Those who resided in the US for at least 5 years also had 2.6 times higher odds of obesity.

**Conclusions:** The second- and third-generation adolescents, those who reported using some or only English, and those who resided in the US for at least 5 years had higher risk of obesity, while they were more physically active. Those who reported only using English also had a higher risk for excessive screen time. Among foreign-born adolescents, the risk of obesity and the prevalence of physical activity increased with the length of time residing in the US. Our results suggest that acculturation is associated with obesity and higher screen time, but it is protective for physical activity. This indicates that along with physical relocation, foreign-born Mexican Americans also experience the changes in social, cultural, physical environments, which determine or interact with immigrant's acculturation level, and further influence immigrant's health and health behaviors.

**Support:** This project was sponsored by Maternal and Child Health Research Program, Health Resources and Services Administration (R40MC17167).





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### 29) Associated Pathways between Neighborhood Environment, Community Resource Factors and Leisure-Time Physical Activity among Mexican-American Adults in San Diego, CA

**Suzanna Martinez, PhD, MS<sup>1</sup>**, *Guadalupe Ayala, PhD, MPH<sup>2</sup>*, *Kevin Patrick, MD, MS<sup>1</sup>*, *Elva Arredondo, PhD<sup>2</sup>*, *Scott Roesch, PhD<sup>3</sup>*, *John Elder, PhD, MPH<sup>2</sup>*

<sup>1</sup>*School of Medicine, University of California, San Diego*, <sup>2</sup>*Graduate School of Public Health, San Diego State University*, <sup>3</sup>*Psychology Department, San Diego State University*

#### **Background:**

Little is known about the social-ecological factors associated with leisure-time physical activity (LTPA) among Mexican-American adults.

#### **Objectives:**

The purpose of this study was to use the Social Ecological Model to develop and examine potential pathways between individual, social, and environmental factors and leisure-time physical activity (LTPA) in a Mexican-American community sample.

#### **Methods:**

Adults living in a U.S./Mexican border community in San Diego, CA were selected (N=672) and contacted by random digit dialing. Using structured telephone interviews, data were collected on LTPA, demographic characteristics, acculturation, and other psychosocial and environmental factors associated with LTPA.

#### **Results:**

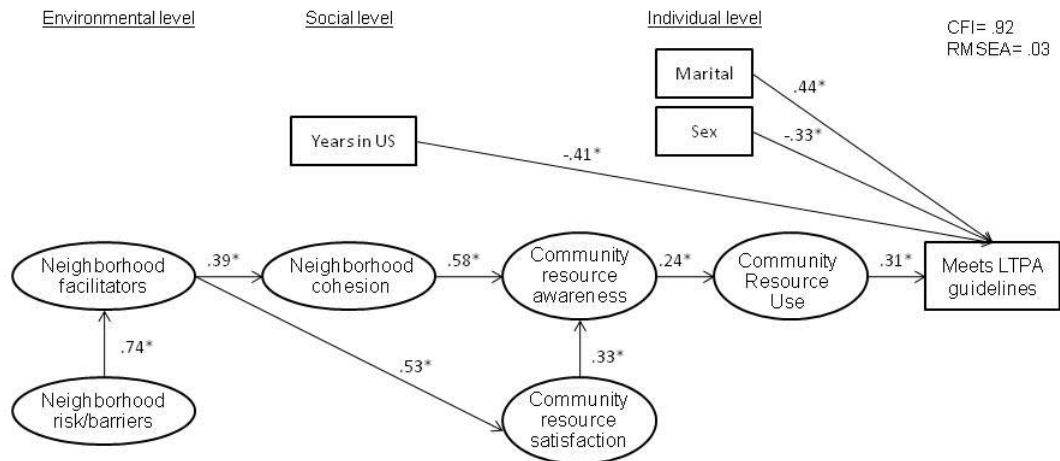
Participants were mostly female (71%) with a mean age of 39 years. Only 32% of participants met PA guidelines in their leisure time, with men (39%) meeting the guidelines more than women (29%). Using structural equation modeling, neighborhood factors, both social and environmental, showed indirect relationships with meeting PA guidelines through community resource factors. Greater years living in the U.S. showed a direct association with LTPA. Significant covariates included marital status and gender.

#### **Conclusions:**

Individual, social and environmental factors were associated with LTPA in this sample of Mexican-American adults. These findings can inform longitudinal studies that aim to increase LTPA in this population.

#### **Support:**

CDC-funded San Diego Prevention Research Center, Core Research Project (U48 DP00036-03) and NHLBI-NIH (1R01HL0088530)



**FIGURE 1** Pathways between individual, social and environmental level factors, and meeting PA guidelines. Note. Only significant pathways are illustrated (t-value > 1.96); CFI= comparative fit index; RMSEA= root mean square error of approximation.



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### 30) Finding Parks: Lessons Learned from Collecting and Cleaning Parks Data in Eleven Texas Counties

*Christine M. Marx, MA<sup>1</sup>, Peg Allen, MPH<sup>2</sup>, Andrew T. Kaczynski, PhD<sup>3</sup>, Christine M. Hoehner, PhD, MSPH<sup>4</sup>*

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#### **Background:**

Public parks are an important resource for promoting active living for all ages. Although research on the health benefits of parks has advanced in recent years, data quality and methodological issues are rarely discussed in detail in research publications. The National Recreation and Park Association (2009) reports that “communities are recording similar information at different scales or recording completely different information.” This lack of standardization for recording and classifying parks is important for researchers, practitioners, community groups, and others who seek to enumerate parks for assessing the availability or quality of parks. In addition, this information would aid in understanding the degree to which measurement error may bias research results on associations between park access and physical activity and obesity risk. The continued lack of documentation of methods impedes the advancement of parks research and the utility of these data for practice.

#### **Objectives:**

The objectives of this paper are to: (1) describe the process of enumerating parks in a large metropolitan region, and (2) summarize major problems encountered when collecting and cleaning secondary data on park availability.

#### **Methods:**

With approximately 6.5 million people in over 200 municipalities, the Dallas-Fort Worth-Arlington, Texas metropolitan statistical area is the fourth largest in the United States. The research setting, defined by participants' locations for a larger study, encompasses the 11 core counties (approximately 8,700 square miles) of this region. The metropolitan planning organization (MPO) for the Dallas-Fort Worth region hosts a Geographic Information Systems (GIS) data clearinghouse, offering regional GIS data to the public at no cost. For this study, we obtained a GIS shapefile of parks for 2007, compiled from the multiple municipalities in the area.

The parks shapefile was clipped to the 11-county study area, then cleaned by identifying overlapping polygons, identifying irregular, small polygons (<1000 square feet), querying names of parks, identifying municipalities with unusually broad inclusion criteria, creating categories for inclusion/exclusion criteria (e.g., buildings, historical, private), using aerial photography and street centerline shapefiles layered with the parks file for reference, and using websites for verification.

#### **Results:**

The dataset for the 11 counties had 2,812 records. Approximately 19 percent of these (n=532) were dissolved into other features because they were multiple records representing a single park. An additional 238 features were deleted because they were not parks (e.g., cemeteries, medians) or because of other categorical errors (e.g., future parks, errors in geometry). Another 132 physical-



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activity related sites (e.g., trails, schools) were deleted because the polygons were not parks and were collected from other data sources. Twenty-one parks that were not found in the 2007 shapefile but were included in an archival version of the file (year 2000) were added to the more recent database. Moreover, 67 parks were digitized and added to the file, based on reviews of park websites. The final dataset contained 1,998 records.

This process illustrated two common problems associated with use of existing GIS parks data. First, despite the availability of secondary data, enumerating parks across large geographic areas can be extremely time-consuming and labor-intensive if the data were not verified and standardized across municipalities and counties. Second, there is little consensus on what constitutes a “park.” The types of land uses included in the parks files from the MPO varied across the municipalities from which these data were collected. Some but not all of the municipalities included cemeteries, medians, park maintenance headquarters, historical sites, mobile home “parks,” zoos, and country clubs. Others included physical activity-related sites that are not parks, such as private facilities, recreation center buildings, schools, and stand-alone tennis and swimming facilities.

### **Conclusions:**

Having accurate information on park locations is extremely important for researchers, practitioners, and others who are interested in promoting active living among youth and adults. Secondary data are an important data source for mapping park availability, particularly across large geographic areas for which primary data collection is impractical. Unfortunately, secondary data may not be adequate for research purposes without considerable verification and modification. In fact, had researchers used the original dataset without extensive cleaning, park availability would have been substantially overestimated and exposure to opportunities for physical activity in the neighborhood would have been misclassified.

For future studies involving parks, it is important that researchers move towards agreement on a definition of a park, in the context of active living research. Researchers should encourage community partners to adopt standard definitions, such as those promoted by NRPA, not just for research purposes but to identify inequities in service and maintenance of facilities. Researchers should continue to conduct micro-scale research to refine the definition and qualities of parks that are most important for supporting physical activity. Finally, researchers using GIS data on parks should not underestimate the potential gap between a working GIS file and a research-ready database, nor the amount of time and effort closing this gap requires.

### **Support:**

American Cancer Society Mentored Research Scholar Grant (MRS-07-016-01-CPPB)



### 31) Urban Design, Socioeconomic Status, Seasonality, and Neighborhood Walking: Findings from the EcoEUFORIA Project

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#### **Background:**

Socio-ecological models implicate multiple levels of determinants of physical activity behavior and active living (individual, psychological, environmental, and policy). The physical environment includes natural (season and weather) and man-made (urban design) attributes, as well as other contextual characteristics (area-level socioeconomic status (SES)). Current evidence suggests that neighborhood environmental attributes including residential density, land use mix, traffic and personal safety, street/sidewalk connectivity, and aesthetics are important factors for walking. Much of this evidence however, is based on cross-sectional studies that do not control for residential self-selection (i.e., individuals deliberately residing in neighborhoods that support their lifestyle preferences). Moreover, it is not known whether the impact of season on walking, particularly in climates with extreme differences in seasonal weather patterns, attenuates by residing in more walkable or higher SES neighborhoods.

#### **Objectives:**

To examine whether or not season, neighborhood SES, and walkability are associated with neighborhood walking for transportation (NWT) and recreation (NRW) while adjusting for residential self-selection, attitudes toward walking, and demographic characteristics.

#### **Methods:**

The study was conducted in Calgary - located east of the Rocky Mountains, at an elevation over one kilometer above sea level, and with a continental climate. Two independent random cross-sectional samples of adults ( $\geq 18$  years) were recruited during telephone interviews between August and October, 2007 (summer/early autumn;  $n=2199$ ; 33.6% response rate) and January and April, 2008 (winter/early spring;  $n=2223$ ; 36.7% response rate) as part of the EcoEUFORIA project (Economic Evaluation of using Urban Form to Increase Activity).

During interviews, respondents provided their six digit postal code which was geocoded and used as a proxy for household addresses. The walkable area (i.e., walkshed) within a 1.6 kilometer radius of the respondent's household was estimated using a line-based street/pedestrian network buffer. City of Calgary and the Alberta Board of Education databases were used to estimate total businesses, public recreation facilities (athletic parks/arenas, leisure and community centers, pools, parks, and nature reserves), and schools (elementary and high school) within each walkshed. Neighborhood population density was estimated using Census data. Urban design variables (walkshed area, businesses, recreation facilities, schools, and population density) were standardized (z) and summed to form a walkability index. A crime index including the count of reported street robberies, assaults, and mischief in the respondent's neighborhood in the previous

12 months was calculated. Two SES indicators, social (sum:  $z\{\text{proportion living alone, proportion renting, proportion of separated/divorced /widowed}\}$ ) and income deprivation (sum:  $z\{\text{proportion without high school diploma, proportion of single parent families, median household income}\}$ ) were calculated from Census enumeration area data (smallest Census geographical unit) and linked to the respondent's neighborhood.

Interviews captured usual participation in sufficient NWT and NWR ( $\geq 150\text{min/wk}$ ), instrumental and affective attitudes toward walking, residential self-selection, and demographic characteristics (gender, age, education, home ownership, and number of dependents  $<18$  years). Items capturing respondents' reasons for moving to the neighborhood formed five self-selection scales (ease of walking, physical activity opportunities, access to transit and services, sense of community, and ease of driving).

Sufficient NWT and NWR were regressed onto season, social and income deprivation (reversed scored), walkability, crime, attitudes, self-selection, and demographic characteristics using multivariate logistic regression. Correlates were added to the demographic adjusted models in the following sequence 1) season; 2) indicators of neighborhood SES; 3) walkability and crime, and; 4) attitude and self-selection.

### Results:

Complete data were obtained from 4266 respondents (women=59.7%; age $<45\text{yrs}$ =45.8%; home owners=80.5%;  $\leq$ high school=32.5%; no dependents=63.2%). Overall, 15.1% participated in sufficient NWT and 34.4% participated in sufficient NWR.

After adjusting for all other correlates, sufficient NWT became less likely ( $p<0.05$ ) as neighborhood social deprivation reduced (odds ratio (OR)=0.94). The likelihood of sufficient NWT was also associated ( $p<0.05$ ) with walkability (OR=1.06), instrumental (OR=1.37) and affective attitudes (OR=1.29), and residential self-selection including physical activity opportunities (OR=1.80), proximity to services (OR=1.67), ease of walking (OR=1.78), sense of community (OR=0.78), and ease of driving (OR=0.49). A significant association between season and sufficient NWT (less likely in winter, autumn, and spring than in summer) attenuated to non-significance after adjusting for all other correlates. Crime was not associated with NWT.

After adjusting for all other correlates, undertaking sufficient NWR was associated ( $p<0.05$ ) with season (less likely in winter than in summer: OR=0.68), instrumental (OR=1.40) and affective attitudes (OR=1.66) and self-selection including the importance of physical activity opportunities (OR=2.04), proximity to services (OR=0.78), ease of walking (OR=1.34), and sense of community (0.79). A positive association between neighborhood income deprivation and NWR attenuated to non-significance after adjusting for attitudes and self-selection. Neither walkability nor crime was associated with NWR.

### Conclusions:

Season, neighborhood SES, and walkability appear to contribute to neighborhood walking even after individual-level characteristics (attitudes and self-selection) are taken into account, although their contributions appear to be walking-specific (transportation or recreational). Our findings also suggest that the association between season and NWT to some extent may be influenced by walkability, neighborhood SES, and individual-level characteristics.



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**Support:**  
CIHR



### 32) Safe Routes to School Travel Surveys: Reliability and Validity of National Survey Instruments

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<sup>1</sup>Department of City & Regional Planning, The University of North Carolina at Chapel Hill, <sup>2</sup>Gillings School of Global Public Health, Department of Epidemiology, The University of North Carolina at Chapel Hill, <sup>3</sup>Department of Health, Mecklenburg County, North Carolina

#### **Background:**

Walking and biking to school are associated with lower rates of obesity and higher physical activity among children. The federal Safe Routes to School program is designed to encourage more children to walk or bicycle to school, and improve safety and environmental conditions around schools. The National Center for Safe Routes to School (NCSRTS) distributes standardized forms to collect data on the number of children walking and bicycling to school, parental reports of travel mode, and parental attitudes toward walking and bicycling to school. Between August 2008 and July 2010, over 65,000 travel mode tallies were conducted in classrooms, and over 374,000 parent surveys were completed. Despite the broad scope of data collection, no published studies examine the measurement properties of these instruments.

#### **Objectives:**

The goal of this study is to validate two survey instruments that are the national standard for collecting school travel data and assessing parental attitudes toward walking and cycling. The first is a student travel tally conducted in classrooms. The second is a written parent travel survey.

#### **Methods:**

Students and parents from two elementary schools in Charlotte, NC, participated in this study in May and June of 2010. One school enrolled many economically disadvantaged (89% eligible for free or reduced lunch) and minority (58% African-American, 29% Hispanic) students. The student travel tally was assessed using student 48-hour test-retest reliability of student-reported travel mode, and agreement between parent and student reports of student travel mode. Survey administration mirrored methods used by practitioners. Over two study days, students were to raise their hand to indicate how they arrived at school and planned to leave for home after school. One of six travel modes was recorded, including walking and bicycling. For student test-retest reliability, students were asked on the second study day to recall their travel modes on the previous day. For parent-student agreement, parents were contacted by phone or email to report their child's travel mode on study days. The reliability of the NCSRTS' parent survey was measured using two-week test-retest reliability of the two-page written survey.

Percentages of agreement and *kappa* statistics are used to assess test-retest reliability and parent-student criterion validity of the student tally, and test-retest reliability of the parent survey.

#### **Results:**

About 60% of students participated in test-retest of the student tally. There was 92.8% agreement between travel modes for the trip to school (*kappa* = 0.86), and 92.1% agreement for the trip home. About 28% of students participated in parent-student comparison of student tally data. Parent and student travel mode response achieved 86.8% agreement (*kappa* = 0.78) for trips to school and





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88.1% agreement ( $kappa = 0.77$ ) for trips home. There was no difference in agreement for either test by student grade level.

Parents of 11% of students participated in test-retest of the parent survey. Test-retest reliability was high for more objective questions such as child's usual travel mode to school (98.4% agreement,  $kappa = 0.97$ ) and home from school (96.6% agreement,  $kappa = 0.93$ ). Test-retest agreement on grade at which child would be allowed to walk or bike was moderate (74.2% agreement,  $kappa = 0.58$ ). Response patterns to questions on barriers to walking or biking to school showed substantial variation. Test-retest reliability was moderate for *any* response to these questions, and lower for individual issues.

### **Conclusions:**

The student travel tally showed high test-retest reliability, and moderate agreement between parent and student reports. Agreement between student test-retest and parent-student responses was similar across student grade levels, suggesting that the student survey is appropriate for all elementary school grades.

The parent survey showed high reliability for more objective questions, yet revealed variations in response patterns to barriers and attitudinal questions that suggest difficulty interpreting these questions. The design of barrier and attitudinal questions might be improved with further research to ensure that parental responses clearly indicate important issues.

### **Support:**

This study was supported by the Active Living Research Program of the Robert Wood Johnson Foundation. The Charlotte-Mecklenburg School District and the Mecklenburg County Health Department helped coordinate and recruit volunteers.



### 33) An Environmental Audit Survey of Children's Neighborhoods: Creating Summary Scores

*Rachel Millstein, MHS<sup>1</sup>, James F. Sallis, PhD<sup>2</sup>, Lawrence D. Frank, PhD<sup>3</sup>, Brian E. Saelens, PhD<sup>4</sup>, Marc A. Adams, PhD<sup>5</sup>, Terry L. Conway, PhD<sup>6</sup>, Jacqueline Kerr, PhD<sup>7</sup>, Kelli Cain, MA<sup>8</sup>*

*<sup>1</sup>Clinical Psychology, SDSU/UCSD Joint Doctoral Program in Clinical Psychology, <sup>2</sup>Department of Psychology, San Diego State University, <sup>3</sup>Community and Regional Planning, University of British Columbia, <sup>4</sup>Psychiatry and Behavioral Health, Seattle Children's Hospital, <sup>5</sup>Active Living Research, University of California, San Diego, <sup>6</sup>BACH, San Diego State University, <sup>7</sup>Department of Family and Preventive Medicine, University of California, San Diego, <sup>8</sup>Active Living Research, San Diego State University*

#### **Background:**

The ecological model encourages understanding of multiple levels of influence on physical activity. One of the emerging areas of research in this framework is determining the effects of the physical and built environment on physical activity. Larger "macro" factors of environments, such as walkability and access to parks and recreation facilities are well-documented correlates of physical activity. However, "microscale" factors including details about streets, intersections, and design characteristics may also influence physical activity. While several microscale streetscape audit tools have been developed, policy-relevant summary scores are not available. Lack of well-documented summary scores has been a barrier to the use of these instruments. In particular, little is known about the specific features of neighborhoods that promote or hinder physical activity among children.

#### **Objectives:**

To develop a reliable and valid scoring system for a microscale observation measure to classify characteristics of neighborhoods that are activity-supportive for children. This study describes a systematic approach to developing a scoring system, the data reduction process, and psychometric analysis for scale creation.

#### **Methods:**

Objective environmental data were collected as part of a larger study examining how neighborhood design relates to physical activity, nutrition behaviors and weight status in children. A total of 759 children ages 6-11 (and their parents) were recruited in San Diego, CA and Seattle/King County, WA. Only San Diego child data are currently available and are presented in this study. Data collection in Seattle is ongoing. An audit tool was adapted from previous instruments, primarily the Analytic Audit Tool from Brownson and colleagues, and informed by expert consensus and formative research. For the present analysis, auditors collected detailed data around the homes of 365 children. Routes began at a participant's home and extended approximately 0.25 miles toward a pre-determined destination. The audit included variables for each route, street segment, intersection, and cul-de-sac. Segments were defined as parts of the street between crossings along the route. The database included 1546 street segments, 800 crossings, and 173 cul-de-sacs. Auditors were trained and certified to ensure accurate data collection. For just over 20% of the routes, another rater completed a second audit to assess reliability. This resulted in 76 routes for the reliability sample.

To develop measurement scales, an a priori framework was created based on relevant literature and expert opinion. The seven general constructs are: destinations and land use (37 items),



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aesthetics and urban design (16 items), pedestrian and bike transportation facilities (30 items), intersections (23 items), traffic environment and street design (22), physical and social disorder/incivilities (9 items), and safety/positive social environment (3 items). Audit items were sorted into the appropriate categories and the distributions were examined. Using the entire sample, items with no or little variance were dropped. Using the reliability sample, inter-rater reliability was assessed using kappa and percent agreement for categorical variables, and intra-class correlations (ICCs) for continuous variables. Items with poor agreement (Kappa or ICC <0.40 and % agreement <60%) were dropped from scales. Items expected to negatively influence physical activity were reverse scored. Scale summary scores will be created and analyzed for reliability. Data analysis is ongoing; sample results from the destinations and land use (DLU) scale are presented here. Future analyses will relate scale scores to moderate-vigorous physical activity (MVPA) outcomes based on children's accelerometer data.

### **Results:**

Based on the a priori framework, the DLU scale included seven sub-scales: residential density, commercial (shops and restaurants), institutional/services (professional services, religious, schools, and government services), adverse land uses (reverse scored; industrial, abandoned lot/buildings, and surface parking lots), transit stops, parking structures that may positively influence physical activity, and recreational land uses (public and private recreation facility). Several items in the DLU scale had little or no variance in their distributions. These items included the residential uses "apartments above street retail," and "retirement/senior living facility." Other land uses with few or no occurrences along routes were: entertainment (e.g., movie theater, arcade), post office, warehouse/factory/industrial, and casino. These items were not included in the scale. All DLU items had acceptable inter-rater reliabilities. The lowest % agreement was 68.4 for small parking lot or garage. All other % agreement values were  $\geq 82.9$ . Three items had poor kappa values, however their % agreement values were acceptable (multi-unit homes: kappa=0.14, % agreement=82.9; specialty food store: kappa=-0.018, % agreement=96.1; and small parking lot or garage: kappa=0.25, % agreement=68.4), so all DLU items were retained. The DLU scale score included 37 items and possessed acceptable reliability (ICC=0.69).

### **Conclusions:**

This measurement development study aims to: 1) create scales to summarize a complex micro-environmental measurement instrument, and 2) use the scales to examine associations with children's physical activity. Next steps in analysis include assessing reliability of the remaining scales, using accelerometer data to validate the scales, and replicating these methods with the Seattle/King County data.

### **Support:**

NIH/NIEHS



### 34) Physical Activity and Mental Health Assessment of Filipino American Youth

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#### **Background:**

The Filipino American community is currently the second largest Asian American/Pacific Islander population (AAPI) in the United States and is projected become the largest AAPI group in 2010 (Nadal, 2009). There have been various educational, mental health, and physical health problems experienced by Filipino Americans that mirror trends in Latino and African American groups. Since Asian American ethnic groups are rarely disaggregated in research, these health disparities for Filipino Americans tend to be overshadowed and the “Model Minority” myth deters researchers from probing into the heterogeneity of the Asian American population.

It has been found that Filipino Americans have a higher prevalence of hypertension and cardiovascular disease than other Asian American groups and have higher rates of diabetes than the general population, with 46% percent of Filipino American adults and 30% of youth reported as overweight (California Asian Pacific Islander Joint Legislative Caucus [CAPIJLC], 2009; Klatsky, Tekawa, & Armstrong, 1996; Ryan et al., 2000; Stavig, Igra, & Leonard, 1988). There is a higher rate of drug and alcohol use than other AAPI populations and a higher rate of depression and suicidal thoughts among Filipino American youth than the general population (CAPIJLC, 2009; Nadal, 2000, 2009; Tompar Tiu & Sustento Seneriches, 1995). Additionally, Filipino Americans have been found to have higher high school dropout, teen pregnancy, and HIV/AIDS rates than other East Asian populations.

While physical activity is known to prevent and treat a variety of health problems, Filipino American parents have been shown to support academic success above physical activity for their children (CANFIT, 2003). Because of this, there is still a need for community education and outreach to combat these health disparities and to make physical activity a priority both for preventative reasons and treatment options.

#### **Objectives:**

The aims of this exploratory study were to assess the relationship between cultural, socioeconomic, and mental health conditions that influence the physical activity of Filipino American youth. By using both quantitative and qualitative methodology, we examined young people’s broad understanding of physical activity; exercise and nutritional habits; access to safe spaces; experiences with racism, ethnicity and acculturation; self esteem and body esteem; the influence of their peers and family members; experiences with the use of substances and feelings towards mental health counseling.

#### **Methods:**

Youth focus groups and individual interviews with community experts were conducted in four study communities across the country: New York, San Diego, Los Angeles, and San Francisco. Community experts (n=23) were chosen using snowball sampling and were required to be highly active in and knowledgeable of the Filipino American community. Sample professions included youth coordinators, physicians, psychologists, social workers, dancers, yoga instructors, and public



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health researchers. Each expert was asked a standard set of open-ended questions pertaining to her/his view on the physical activity and mental health of Filipino American youth. Each was invited to join an advisory board in order to provide additional feedback.

Fourteen focus groups with 4-10 Filipino American youth participants (ages 12-17) were recruited through four Filipino American nonprofit organizations serving New York and California. Each group was asked a standard set of open ended questions that focused on the following areas: messages about physical activity; physical activity habits; reasons for exercising or not exercising; accessibility and safety of spaces for physical activity; peer and family influences; self and body esteem and messages about mental health counseling.

### **Results:**

Focus group and interview transcriptions were coded for general domains and themes. A sample of themes included 1) Preference for indoor, sedentary activity (i.e., surfing the internet, watching TV, chatting with friends online); 2) Physical activity linked only with organized school sports; 3) the pressure to value academics over physical. Many of the youth who were active framed their participation in physical group activities as a social outlet. Dismay was expressed over lack of safe spaces and convenient access to these spaces for activity.

Preliminary analysis of the questionnaire has found that (a) higher levels of physical activity correlated high with mental health measures and self-esteem; (b) levels of experienced racism negatively correlate with mental health scores. Analyses in progress include the interactions of physical activity, gender, and family influences. Themes from the focus group are discussed to further understand the proximal and distal variables that may influence the physical activity levels of Filipino American youth.

### **Conclusions:**

Discussions with Filipino American youth revealed few are physically active throughout the year but are increasingly aware of the importance of exercise for their health as well as self esteem. Many engaged in enjoyable activities with friends and peers but felt there were few safe spaces to engage in physical activity. Youth and key informants identified both barriers and opportunities to be addressed through further research and eventual community outreach efforts.

### **Support:**

Robert Wood Johnson Foundation - Active Living Research New Connections



### 35) Are Perceptions of the Built Environment Associated with Walking among Retirement Village Residents?

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**Background:** Retirement villages are a popular housing option for older adults in many countries. In general, such residents are relatively independent and mobile, thus travelling outside the village boundary and into the wider neighborhood surrounding the village on a regular basis. Research investigating built environment influences on walking in older adults specifically has become more common in recent times. But the context of retirement villages remains relatively unexplored, with little work considering the layout and design within a village alongside neighborhood form surrounding a village, and its associations with walking in older adults.

**Objectives:** The objective of this analysis was to examine associations between retirement village residents' perceptions of the built environment in their village and local neighborhood environment, and walking. It was hypothesized that village and neighborhood environment factors would both be related to residents' walking behaviors.

**Methods:** Retirement villages (n=32) in Perth, Australia were selected based on the walkability of the neighborhood in which they were located. A sample of residents from these villages (n=325) completed a questionnaire that included items measuring environmental attributes within the village and local neighborhood (a 10 to 15 minute walk from the village) and physical activity. The perceived neighborhood environment was measured using selected sub-scales from the Neighborhood Environment Walkability Scale (abbreviated version) and additional single items, and a modified version captured perceptions of the internal village environment. The three outcomes were walking leisurely at least once a week, brisk or fast walking at least once a week, and walking for transport at least once a week. Each outcome was regressed onto individual environmental variables and covariates (age, gender, highest level of education completed, physical functioning, and neighborhood walkability) in single models using generalized linear modeling to account for village-level clustering. All village and neighborhood environmental variables that were significant at  $p \leq 0.2$  in the single models were then regressed with the same covariates in multivariate models for each walking outcome.

**Results:** Residents were aged from 53 to 94 years (M: 76.8 years, SD: 7.4) with 67.7% of the sample female. Overall, 61.2% of residents reported walking for leisure at least once a week, 44.9% reported brisk walking at least once a week, and 50.0% reported walking for transport at least once a week. In the multivariate models, leisure walking at least once a week was positively associated with village aesthetics, less hilliness in the neighborhood, and traffic signals in the neighborhood giving enough time to safely walk across the road. In addition, the odds of walking for leisure was greater when one to three services and facilities were present within the village, compared with having none available (OR: 2.81, 95% CI 1.08-7.38,  $p=0.036$ ), and the odds halved when residents perceived that many activities and events were held within their village (OR: 0.49, 95% CI 0.25-0.99,  $p=0.049$ ). Good connectivity within the village was positively associated with brisk walking at least once a week (OR: 1.84, 95% CI 1.10-3.07,  $p=0.020$ ), however the odds significantly reduced when four or five services and facilities were present within the village, compared with having none available (OR: 0.39, 95% CI 0.19-0.80,  $p=0.011$ ). No village environment factors were related to



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walking for transport, but living in a neighborhood with more services and facilities (OR: 3.87, 95% CI 1.89-7.91,  $p < 0.001$ ) and less hills (OR: 1.85, 95% CI 1.06-3.24,  $p = 0.030$ ) was positively associated with walking for transport.

**Conclusions:** This study attempts to fill a void in the literature relating to built environment factors that impact on walking among retirement village residents. Overall, the study found that perceptions of both the environment within and outside the village were associated with different walking behaviors in retirement village residents. It appears that more activities and services and facilities within a village are associated with less walking in residents, however more services and facilities in the neighborhood is associated with more walking. This has key implications for policy and practice, highlighting the importance of considering the layout, design, and services provided within a retirement village alongside neighborhood attributes in which the village is located.

**Support:** Australian Postgraduate Award



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### 36) Addressing Obesity in Texas: A Ten Year Review of Research, Policy and Program Development, and Pioneering Legislative Action

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#### **Background:**

In 1995, the prevalence of adult obesity in Texas mirrored the national average, 15.9%. By 2009, 29.5% of Texas adults were obese, an increase of almost 100%. Child obesity levels in Texas have also been documented as being higher than the national average. Texas is ranked as 20<sup>th</sup> in the nation for child obesity (1), and has 5 of the 10 “fattest” cities in America (2). The Office of the State Demographer has recently warned if current trends continue, nearly half of the Texas population will be clinically obese (i.e. Body Mass Index (BMI) > 30) by 2040. The Texas Department of State Health Services estimated such a scenario would generate annual health care costs of approximately \$40 billion. Obesity in Texas is a serious public health issue which threatens both the health of its citizens and the overall economy.

#### **Objectives:**

The objective of our presentation is to discuss what Texas has learned in its efforts to address the obesity epidemic statewide. We will focus on the development of obesity awareness beginning in the 1990’s, and then discuss the actions of many non-governmental stakeholders to combat this epidemic, including: philanthropic organizations, public health advocacy groups, corporations, local community health partners, and other non-profit entities.

In addition, we will discuss the role of obesity research conducted through organizations such as the Michael & Susan Dell Center for Healthy Living; UT Health, School of Public Health; the Texas A&M Health Science Center, School of Rural Public Health; and the Texas Health Institute.

Finally, we will describe the role of policy-makers in both the legislative and executive branches of state government through key pieces of legislation as well as administrative rules and executive orders.

#### **Methods:**

The approach included: a PRISMA systematic literature review; a review of governmental and public health advocacy data; and interviews with prominent Texas public health officials. The PRISMA literature review and public health advocacy data served as the foundation of our evaluation of past efforts to recognize obesity and to attempt interventions. The interviews with public health officials were used to provide more subjective commentary to the analysis based on the experience of those who were actually in positions of influence and/or authority during this time period.

#### **Results:**

Obesity was not a significant public policy topic in Texas until 2001. The fulcrum for moving past recognition of obesity in the late 1990’s into action at the turn of the century was legislative momentum, specifically targeted at child obesity through school-based approaches. However, while





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legislation is important, the role of non-governmental entities is just as vital in addressing the obesity epidemic in Texas. Through innovative policy and community health directives (e.g., regulating nutritional content in school vending machines, mandating physical activity in schools, and disseminating evidence-based school health programs such as CATCH, the Coordinated Approach To Child Health), Texas has not only become acutely aware of the challenges of obesity, but actually has pursued a policy of innovation that can be disseminated to other states seeking knowledge on how to address the epidemic.

### **Conclusions:**

The response to this relatively new epidemic has been swift and innovative, with several significant and progressive steps taken through research and policy. In order to understand how obesity developed so quickly in Texas, and how it has subsequently been managed, researchers must evaluate the role of both legislative and non-profit efforts. The lessons learned from such an evaluation not only provide a blueprint for addressing obesity in Texas, but likely a blueprint for other states to emulate as well.

### *References:*

- (1) Trust for America's Health. *F as in Fat: How Obesity Policies are Failing America*. 2009.
- (2) Colletti J, Masters M. *America's Fattest Cities : Men's Health Metrogrades*. 2010; Available at: <http://www.menshealth.com/fattestcities2010/>. Accessed 8/6/2010, 2010.



### 37) Examining Effects of Community Smart Growth Planning on Physical Activity During Economic Downturn: A Partnership Model

*Mary Ann Pentz, PhD<sup>1</sup>, Genevieve Dunton, PhD<sup>1</sup>, Thomas Valente, PhD<sup>1</sup>, Jennifer Wolch, PhD<sup>2</sup>, Michael Jerrett, PhD<sup>3</sup>*

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#### **Background:**

Originally developed as part of new urbanism, the use of smart growth community planning principles for community planning is emerging as a type of built environment intervention for promoting physical activity, and is already spawning the next wave of community planning that may have an impact on health, including green building and LEED standards. Yet, there has been little systematic evaluation of smart growth's impact on physical activity, whether residence in smart growth community can buffer or otherwise mitigate adverse "events" such as the economic downturn in the U.S., or how these research findings can be moved to community action. The present study draws from an ongoing built environment prevention trial, Healthy Places, to evaluate whether residence in a smart growth community differentially affects physical activity during economic downturn. It also outlines how a tripartite partnership of an interdisciplinary team of researchers, planners, and a Healthy Cities Coalition are guiding the interpretation and use of findings for future community improvement. The partnership model is adapted from a widely disseminated model of community organization that was developed for The Midwestern Prevention Project, a substance abuse prevention trial that has shown effects on preventing substance use, increasing physical activity, and decreasing obesity risk.

#### **Objectives:**

(1) To evaluate physical activity during a period of economic downturn; (2) To evaluate whether residence in a smart growth community mitigates adverse effects of economic downturn on physical activity; and (3) To illustrate how research findings are moved to action through a community partnership.

#### **Methods:**

The research design is a hybrid 3 group design, with parent-child pairs from 6 communities recruited into the study (intervention = randomly selected for move to a smart growth community; randomized control=attempt to move, but randomly non-selected; demographically matched control=families matched to intervention community families on income, grade of child, ethnicity, and residence in adjacent communities). The measurement design is longitudinal over 4 years. The present study evaluated the interim, accrued sample of n=392 families from 6 communities in the first wave, using parent self-reported data from a larger set of measures that include self-report and network surveys, anthropometric measures (height, weight, waist), accelerometer and GPS logger measures, neighborhood audit inventory, and GIS mapping of communities, neighborhoods, schools, and 1/2 mile buffer zones around residence. Outcome measures for this study included composite scores of walking for physical activity, sedentary activity, calculated MET hours and kcal from the Arizona Activity Frequency Questionnaire, and number of consolidated trips/stops in cars (representing time spent in cars). Predictors included a composite score of economic downturn



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(ED) from the Economic Hardship Questionnaire, and ED x experimental group effects (positive main effects on physical activity have been shown in another study). Covariates included ethnicity, gender, income, age, and marital status. Data were analyzed with proc.mixed, controlling for community as level, with individual as the unit of analysis. All p levels are reported as 2-tailed tests.

### **Results:**

The analysis sample consisted of 376 adults with complete data, mean age 39, 84% female, 54% Hispanic (white and non-white), 26% white, 19% other; median household income \$60,000; 4.82 average household size; all with at least one child between grade 4 and 8. A total of 33 reported recent unemployment within the last year, which was highly related to ED ( $p=.004$ ). ED scores did not differ between experimental groups and group showed no interaction with ED on activity. However, smart growth community adults showed significantly greater physical activity represented by walking in the neighborhood compared to either the random ( $p<.02$ ) or matched control ( $p<.02$ ). Hispanic ethnicity was positively related to MET hours/day ( $p=.05$ ) and less sedentary activity (tv and reading;  $p<.0001$ ). ED was associated with a greater number of stops made to consolidate car trips ( $p<.05$ ) and greater MET hours ( $p=.05$ ). However, recent unemployment was associated with both MET hours ( $p<.01$ ) and lower kcal ( $p<.05$ ). On-site facility managers and housing association members of the partnership have used the findings to plan future events for smart growth community residents that are aimed at promoting new friendships for physical activity. Results have also been used by the Healthy Cities Coalition partnership members to plan community events that are aimed at walkability.

### **Conclusions:**

Results of this study thus far suggest that residence in a smart growth community does not mitigate effects of economic downturn. However, the effects of ED and recent unemployment on physical activity patterns may be complex. For example, recent unemployment may increase depression and attempts to find a job, both of which factors may detract from physical activity. ED, on the other hand, may represent coping strategies and greater walking in order to save money. The partnership represented by academic researchers, community planners, and a healthy cities coalition are expected to expedite the streaming of research findings such as these into practical, community actions for physical activity.

### **Support:**

Parent NCI Grant; Active Living Research; Lewis Operating Corporation



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### 38) The Impact of Park and Playground Quality and Conditions on Physical Activity: Research to Inform Local Policies to Promote Active Living in an Urban Latino Community

*Flavia Perea, PhD, MEd<sup>1</sup>, Alyssa Koomas, MS/MPH Candidate<sup>1,2</sup>, Linda Sprague-Martinez, PhD<sup>3</sup>*

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#### **Background:**

Moderate levels of physical Activity (PA) can reduce the risk of cardiovascular disease, diabetes and obesity. Americans have low levels of PA, and 25% of youth ages 12-21 participate in no PA. People, particularly children/youth, from low-income minority communities, have poorer access to (safe and quality) opportunities for PA and are less likely to engage in regular PA. Additionally, evidence indicates girls are more likely to be sedentary and boys to engage in vigorous PA. Environmental characteristics such as parks/playgrounds influence PA. An ecological approach to understanding PA patterns is important to identify contextual influences on behavior. Proximal factors (eg, family) are more easily understood as directly impacting health. This is different from more distal factors, such as the quality/condition of parks/playgrounds, which might more indirectly affect health/behavior. However, these are more difficult to observe and measure and less is understood about if and how they impact behavior/health, such as PA. These factors reflect policies that can affect amenities and maintenance, which can determine the quality/condition of park/playgrounds, indirectly influencing PA. Because minorities, particularly children/youth, are at risk for poor health associated with low PA, understanding how the quality/condition of parks/playgrounds in minority communities influences PA is important to identify barriers and develop appropriate policy responses.

Lawrence, MA is a poor, minority community that is 69% Latino and almost 50% foreign-born. 30% of the population is under 18 and 43% under 24. Obesity and related chronic conditions are disproportionately prevalent and age-adjusted rates of coronary heart disease, hypertension and diabetes are higher than state rates. Only 40% of adults reported participating in regular PA. Because obesity and related chronic conditions often result from patterns established in childhood, it is important to improve opportunities to develop healthy lifestyles early in life, such as through better opportunities for PA.

#### **Objectives:**

We hypothesize the quality/condition of parks/playgrounds, amenities and the incidence of incivilities (eg, vandalism) in such spaces, affects how they are used. The objectives of this research are to assess the utilization and quality/condition of parks/playgrounds to determine if and to what extent these factors can explain variations in PA level among Lawrence residents.

#### **Methods:**

We assessed park/playground quality/conditions using the Physical Activity Resource Assessment (PARA) and utilization with the System for Observing Physical Activity and Recreation in Communities (SOPARC) tools. 34 Parks were observed starting 5/10 (continuing through 10/10) in the morning, afternoon and evening during 1 week and 1 weekend day each week.



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PARA data include incivilities (the presence of litter, graffiti and vandalism, evidence of alcohol use), amenities (eg bathrooms, drinking fountains), and features (eg, equipment) ranked on a scale of 0-3 (n/a, poor, mediocre, good), as well as weather conditions. SOPARC data document the estimated age and gender of each individual in a park during each observation, their activity type and PA level on a scale of 1-3 (low, medium, high).

### **Results:**

The sample consisted of 461 males and 277 females (N=738), of which 204 were children, 211 teens, 258 adults, and 6 seniors. Individual regression analyses revealed that incivilities and amenities were all significantly predictive of PA at the  $p < .001$  level when controlling for age and gender. Although the adjusted R-squared for each of the six models was small, litter (0.14), graffiti (0.15), vandalism (0.12), evidence of alcohol (0.13), bathrooms (0.16), and drinking fountains (0.17), there were only three variables in each model. All results found that increased age and being female were negatively associated with PA.

More comprehensive multivariate analyses and structural equation modeling analyses are being completed and will be presented as part of scholarly dissemination presenting findings from this research. Based on these preliminary results, and because of the large sample size which will increase, it is anticipated that efforts to model the above factors in one or more larger models will be successful and likely yield significant results. These analyses will emphasize understanding differences based on age and gender.

### **Conclusions:**

Findings indicate the quality/condition of parks/playgrounds impact utilization and can explain some of the variation in PA level. This is consistent with research identifying the influence of environmental characteristics on PA. Within an ecological framework, these neighborhood and environmental factors are evidently having an effect on peoples' health behaviors. The condition of parks/playgrounds in Lawrence is in part the result of local policies affecting their quality and the amenities present. Additionally, consistent with the extant literature, girls/women were less likely to engage in PA that was more. Results have identified some of the barriers to PA. Results should inform local policy and programmatic responses to manage and maintain these precious spaces.

### **Support:**

This research is funded by an RWJF ALR/New Connections grant (ID# 67308). The study is currently underway and we provide preliminary results here. Data collection will be completed 10/10. If invited to present we will present complete and comprehensive results.



### 39) Families on the Move - Physical Activity Time Can Be Family Time

**Nicole Peritore, BA<sup>1</sup>, Kelly Webber, PhD<sup>2</sup>, Janet Kurzynske, PhD<sup>2</sup>, Debbie Murray, MA<sup>1</sup>, Stephanie Rose, MD<sup>3</sup>, Mark Purschwitz, PhD<sup>4</sup>, Diana Doggett, MA<sup>1</sup>**

<sup>1</sup>Human Environmental Sciences, University of Kentucky, <sup>2</sup>Nutrition and Food Sciences, University of Kentucky, <sup>3</sup>Internal Medicine, University of Kentucky, <sup>4</sup>Biosystems and Agricultural Engineering, University of Kentucky

#### **Background:**

Kentucky is particularly affected by the obesity epidemic. According to the 2009 Youth Risk Behavior Survey, only 32.9% of Kentucky high school students and 44.6% middle school students attend a physical education class at least once a week. Computer time and video games unrelated to school also can distract children from participating in physical activity. Current surveys show that 23% of high school students and 31.3 % of middle school students spend three or more hours a day on computers.

In 2000, Sallis *et al* (2000) published a review of 108 studies that evaluated correlates of physical activity in children, ages 4-12, and adolescents, ages 12-18. This review found that, for children, the overall perceived barriers to physical activity, level of parental physical activity, time spent outdoors, and access to facilities and programs for physical activity were all correlated with time spent in physical activity.

#### **Objectives:**

The aim of the Get Moving Kentucky: Families on the Move initiative was to

1. Engage the entire family in physical activity
2. Increase the number of steps that each family takes over a 6 week period

It was hypothesized that families will increase their levels of physical activity, as measured in average number of steps per day, when made aware of options for physical activity in their community

#### **Methods:**

The Health Education through Extension Leadership program at the University of Kentucky collected baseline data for a 6 -week family walking program in 32 counties using the America on the Move (AOM) website as a collection system. This session took place for six weeks in the fall of 2009. Pedometer step data were collected on all participants in the walking program and entered into the AOM website.

Logs were created and distributed to each participating family on a weekly basis. The logs included spaces to record steps, describe the setting for the physical activity, and how long the family participated in the activity. Weekly supplemental materials were included with the logs. The supplemental materials offered tips on ways to engage the entire family in physical activity as well as ways to incorporate more physical activity into family life.

#### **Results:**

25 counties had at least one family complete the entire 6 weeks of family physical activity and turn



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in their logs. There were a total of 305 families or 435 adults and 366 children participants. 15% of participants increased their weekly steps by at least 1 mile or 2000 steps. The baseline number of steps for the entire cohort was 615,060, taken as the first three days of the program. At the completion of the six week program, the cohort took over 846,931 steps resulting in a significant increase of steps ( $p < .002$ ) taken in the last three days of the program. More than 80% of the population reported using either neighborhood areas or the local school property for physical activity. There were 7 counties that did not have anyone complete the 6 week program.

### **Discussion:**

Time for physical activity continues to be a challenge for families. Through the encouragement of the Families on the Move initiative families were given an opportunity to not only spend time together, but encouraged to spend that time doing physical activity. Hectic schedules of children often become a barrier as well as various age groups among one family's children. However, of those families that participated in the program, the majority did increase their physical activity. Walking provided the families with an activity in which everyone, regardless of age, could participate.

There were limitations in the study. The project was brought to the community through the University of Kentucky Cooperative Extension Agents. Each agent distributed materials to suit their individual community which resulted in more than one method of delivery. It is possible that the some counties did not have anyone complete the program due to material distribution issues.

### **Conclusions:**

This data provides the researchers with information regarding the amount of walking and physical activity that families in Kentucky participate in and where they usually perform physical activity. Community members were able to get involved and engaged in physical activity while still spending time with the family. This data can be used to establish the need for policy changes to improve the built environment with the provision of areas in the community for family physical activity. It is an expectation that the families on the Move initiative will continue to provide the communities with an effort to engage the entire family in physical activity.



### 40) Increasing the Variety of Traditional Active Toys and Exergames to Promote Physical Activity in Children

**James Roemmich, PhD<sup>1</sup>**, Maya Lambiase, MS<sup>1</sup>, Tom McCarthy, BS<sup>1</sup>, Denise Feda, PhD<sup>1</sup>, Karl Kozlowski, PhD, ATC<sup>2</sup>

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#### **Background:**

The basic parameters that promote physically active play have not been widely studied. Increasing the variety of a commodity increases consummatory behavior for that commodity, so presenting children with greater options for active play may increase activity during a play session. Youth activity guidelines promote participation in a variety of activities to produce overall fitness, but the effect of variety on increasing exercise behavior *per se* has not been widely considered. A challenge that children face when attempting to meet physical activity goals is making the choice between screen time behaviors, such as videogames and being physically active. Exergames combine gaming with movement and have blurred the concept of screen time as a sedentary behavior. However, the physical activity associated with exergames relative to traditional active toys must be known to understand the implications of their use as an alternative to traditional active play. Moreover, it is important to understand how exergames can best be used to motivate healthy behaviors. The intrinsic motivation necessary to master a level of an exergame before advancing to the next level may promote increased adherence to the play of a single game, reducing the need for variety to promote greater physical activity, at least in the short-term. A key study design issue when comparing physical activity during traditional active toys and exergames is to match the activity type as closely as possible so that activity differences are due to inherent differences in toy design. There are necessary motor movements to engage in play with traditional active toys including the need to shoot, retrieve and chase after balls and pucks while play with exergames is dependent on handheld controllers and software that resets the play environment while the participant rests. These differences in motor movements and in activity intensity and play duration determine the total physical activity.

#### **Objective:**

To determine whether increasing the variety of traditional active toys or exergames promotes the greatest increase in physically active play.

#### **Methods:**

To date 20 boys and 15 girls have completed a 3-factor design with sex and variety group [(1 toy n=17), (3 toys n=18)] as between factors and toy design (traditional/exergame) as a within factor. Each subject completed two 60 min sessions with access to either their 1 most highly ranked or 3 most highly ranked traditional toy(s) (indoor basketball, boxing an inflatable punching bag with gloves, indoor mini golf, indoor hockey) on one visit and exergame version(s) of the same toy(s) (Wii Sports Resort Basketball, Wii Sports Boxing, Wii Sports Golf, Mario and Sonic at the Winter Olympic Games Hockey) on another visit in counterbalanced order. Traditional toys were rated ages 6y and up and exergames were rated everyone 6+ y. Children had equal access to alternative sedentary behaviors of resting, children's magazines, and puzzles at both visits. Outcome measures included total minutes of active play determined by remote observation via a closed-circuit camera and physical activity counts (CSA accelerometry).





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### Results:

There were no sex ( $p \geq 0.09$ ) or variety group ( $p \geq 0.15$ ) differences in physical characteristics, hr/week playing exergames, or liking of the sedentary alternatives. Liking of each toy was rated  $\geq 6$  out of 10 for both boys and girls. Increasing toy variety had a greater (sex by variety group interaction:  $p < 0.06$ ) effect on girls' (14.4 min vs 32.2 min) than boys' (21.7 min vs 28.7 min) playtime. There was a significant ( $p < 0.01$ ) variety group by toy design interaction for playtime as variety increased activity for exergames (1 toy 22.5 min vs 3 toys 41.4 min,  $p < 0.001$ ) more than traditional toys (1 toy 13.6 min vs 3 toys 19.5 min,  $p < 0.06$ ). Average physical activity counts were also dependent on the interaction of sex and variety group ( $p < 0.02$ ). Increasing toy variety from 1 to 3 toys had a greater effect on increasing girls' (171 vs 406 counts/min,  $p < 0.005$ ) than boys' (283 vs 256 counts/min,  $p \geq 0.69$ ) physical activity. Girls and boys did not differ for average activity counts when given access to 1 toy ( $p \geq 0.17$ ), but did for 3 toys ( $p \leq 0.05$ ). There was a main effect of toy design ( $p < 0.001$ ) as playing with traditional toys (367 counts/min) produced greater average counts across the 60 min play session than exergames (195 counts/min).

### Conclusions:

Providing a variety of active toys increases playtime of both traditional active toys and exergames, but increases exergame playtime more than traditional active toys. Girls, who are traditionally less active than boys, are very responsive to increases in the variety of active toys as noted by greater increases in both active play time and physical activity counts. Though children spent less time playing traditional active games than exergames, the average activity counts/minute across the 60 minute session were greater for traditional toys than exergames. So, play with traditional active games is more intense than engaging in the same activity as an exergame.

**Support:** NIH R01HD055270 to Dr. Roemmich.



### 41) Complete Streets Best Practices: How America's Largest Cities are Reforming Their Street Design Policies to Combat Obesity and Encourage Active Living

**Bill Sadler, JD, MURP**

*Reconnecting America*

#### **Background:**

Auto-oriented streets contribute to the obesity epidemic because they discourage walking and bicycling, and thus limit opportunities for physical activity. Streets in many communities are designed to move cars, not people, and prevailing laws and engineering standards often make the routine accommodation of pedestrians and bicyclists a challenge for both planners and public health officials looking to improve the health and quality of life of community residents. Complete streets policies are emerging as an innovative way to address these challenges. Such policies require that all street design and construction projects incorporate sidewalks, bicycle lanes, and other multimodal facilities. As a result, communities that adopt complete streets policies can encourage physical activity and potentially lower obesity rates because the streets become safer and more attractive for walking and bicycling trips.

#### **Objectives:**

Creating an effective complete streets policy requires collaboration between numerous local agencies and organizations. Little to no research to date has examined the effectiveness of complete streets policies, nor has it identified all of the parties that need to be involved in the planning of a policy. The objective of this study was to fill this research gap and identify best practices among the communities that have already adopted a complete streets policy. Specifically, this study sought to answer the following questions:

1. How many of America's largest cities have adopted complete streets policies?
2. At what level of government are complete streets policies the most effective in promoting active living?
3. Is there a form of policy that works best or have communities been successful with a variety of policy tools?
4. Which communities have been the most successful in implementing complete streets policies, and what factors have made them successful?

#### **Methods:**

To fulfill the above objectives, the researcher collected data from 61 of America's largest cities, relying on 2008 population estimates from the United States Census Bureau. The researcher then used the National Complete Streets Coalition's online atlas of complete streets policies to see which of these sixty-one cities had an officially recognized complete streets policy at the local, regional, or state level. After creating a list of cities with policies, the researcher then looked at the form and scope of these policies, categorizing them into five categories: (1) legislation/ordinance, (2) executive order, (3) resolution, (4) internal policy, and (5) planning documents. Finally, the researcher selected five cities as case studies of best practices.

#### **Results:**

Among the 61 cities part of this study, sixteen had complete streets policies at the city level as of August 1, 2009. There were also five county-level, nine regional-level, and twenty-six state-level



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policies. Overall, there were 15 states without any policy, representing 25% of the study sample. There were five ordinances, three resolutions, two executive orders, two internal policies, six plans, and four manuals or design guidelines. Four cities had more than one policy. In general, the ordinances contained the strongest language, followed by internal policies and some planning documents. Resolutions and executive orders tended to be the weakest, because they merely call for the creation of “complete streets” or set up a task force to explore the possibility of incorporating complete streets into transportation planning. The sampled cities that have had the most success implementing a complete streets policy were Seattle, New York City, Louisville, Boulder, and Charlotte. Each city has used a different set of tools to implement their complete streets policies, and all have included different sets of partners in the policy planning effort.

### **Conclusions:**

Despite the success of complete streets in these cities and the widespread adoption of complete streets policies around the country, there is a lack of uniformity among these policies. Some address all streets and all users, while others only apply to certain users, certain types of streets, and/or certain types of funding sources. Many also contain exceptions that make it easy to forego the requirements. Leadership is also an important factor, as New York City has succeeded in transforming many streets into complete streets because its leaders, including Mayor Michael Bloomberg and Transportation Commissioner Jannette Sadik-Kahn, have made a conscious effort to address all users. Other cities with similar types of plans have not had much success in implementing their policies because their leaders are not fully committed to the policy. Nevertheless, complete streets policies have helped communities promote active living, and in the future they may be a key environmental strategy in the fight against obesity.

### **Support:**

This study was conducted as a research project for the City and County of Denver’s Living Streets Initiative, an interdepartmental effort to create a complete streets policy for the city. The Community Planning and Development department provided technical assistance and the University of Colorado Denver provided funding. All research took place in Denver, Colorado, but the researcher did extensive outreach to other communities to get information on their complete streets policies.



### 42) Understanding the Environmental Determinants of Physical Activity in Curitiba (Brazil)

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#### **Background:**

Over the past two decades the prevalence of obesity and various chronic diseases have risen dramatically in Brazil and throughout the entire Latin American region. Inadequate levels of physical activity are a known risk factor for obesity and various chronic diseases. Although in some developed nations the environmental as well as some policy determinants of physical activity have been extensively defined, this has not been the case for Brazil; where very few studies have been published addressing this matter.

Epidemiologic surveillance should not merely focus on the prevalence of chronic diseases but also on their risk factors (including the environment). A better understanding of the environmental determinants of physical activity in Brazil will allow design of surveillance tools with which we will in turn be able to monitor the presence of risk (or protective) factors for obesity and chronic diseases within the environment of Brazilian and other Latin American cities.

#### **Objectives:**

(1) To identify potential environmental predictors of physical activity in Curitiba. (2) To construct statistical models to predict leisure time physical activity practice in Curitiba by using environmental variables.

#### **Methods:**

A questionnaire regarding physical activity and environmental variables was applied to a total of 1461 adult participants from the city of Curitiba.

Pearson's correlation tests for each of the environmental variable. Statistical significance was considered at an alpha level lower than 0.05. Using the available data, two linear predictive statistical models were generated, one to predict leisure time physical activity and one for transportation physical activity. All of the variables attaining statistical significance were considered as potential predictors for the model. The modeling strategy also included the inclusion of potential confounding variables such as age, sex and education level (used as a proxy for socio-economic level).

#### **Results:**

Two linear predictive models were generated. The model predicting leisure time physical activity had an R-Squared of 0.71. The model includes variables such as park usage, natural attractions in the neighborhood, proximity to a community center, etc. The model predicting time spent in physical activity for transportation had an R-Squared of 0.19, and included variables referring to neighborhood density, availability of biking trails, car ownership amongst others. All of the predictors included in the model have a  $p \leq 0.05$ . Both models control for the effect of age, sex and education level.



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### **Conclusions:**

This study was able to generate a model to predict leisure time physical activity with an R-Squared of 0.71, meaning that over 70% of the variability of leisure time physical activity for adults in Curitiba is explained through this model. This underlines the importance of environmental factors with regard to health related habits such as physical activity. The variables within this model should be employed within a surveillance scheme to track not only the changes in obesity and chronic disease prevalence within populations, but also of their environmental risk or protective factors. On the other hand, the model obtained to predict physical activity for transportation had a much lower R-Squared (0.19), emphasizing the need for further studies to understand the determinants for such outcome and further apply them through programs and policies.



### 43) Heath Economic Assessment Tool for Active Transport (HEAT) for Cycling in the US: Evaluating the Cost Savings of Cycling Infrastructure

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*The Division of Nutrition, Physical Activity, and Obesity (DNPAO), Centers for Disease Control and Prevention*

#### **Background:**

With competing transportation needs it is important that we develop tools to evaluate the benefits of non-motorized transportation in the US since non motorized transportation is associated with greater levels of physical activity. Economic appraisals are an established practice for transport projects; however, they rarely take health effects into account. The World Health Organization therefore coordinated an international project to develop the Health Economic Assessment Tool (HEAT), which estimates health benefits from active transport.

#### **Objectives:**

Modify the European HEAT tool to the US.

#### **Methods:**

The original HEAT tool, which estimates the cost savings of reduced mortality due to cycling for transportation, was modified to include standard US metrics and US data when available. Using data from the 2009 NHTS there are currently 1,123,076 cycling trips per day for transportation with a mean trip length of 3 miles. In addition, the DOT values the statistical value of a life at 6.2 million dollars.

#### **Results:**

Currently the cycling infrastructure in the US saves approximately 2 billion dollars a year and saves 423 lives per year. Each individual cyclist saves \$19 per trip and \$4,673 per year.

#### **Discussion:**

In 2009 the federal spending for pedestrian and cycling infrastructure was 1.2 billion dollars which is much higher than previous levels of funding but only represents 2% of spending on infrastructure projects. Currently only 1% of all trips are made by bicycle but they appear to account for large cost savings due to reduced mortality. It should be noted that these are conservative estimates since they do not include cycling trips for recreation or cost savings due to reduced morbidity. Thus it appears that continued investment in cycling infrastructure is a cost effective way to spend federal transportation dollars.



### 44) Urban Adolescents' Neighborhood Physical Activity Environments

*Sandy Slater, PhD, Marian Fitzgibbon, PhD*

*Institute for Health Research and Policy, University of Illinois at Chicago*

#### **Background:**

The prevalence of obesity is found to be significantly higher among: black and Hispanic populations compared to their white counterparts; low- versus high-income groups; and, low- versus high-education groups. Research has also shown that lower-income youth participate less in physical activity. One possible reason for this could be lack of quality of existing facilities. Currently there is a paucity of research examining the presence of specific park/recreation facility features and physical activity. There is some evidence that adolescents utilize parks less frequently than children and adults and that the park features that attract youth do not necessarily appeal to adolescents. Given that physical activity can help to reduce the prevalence of obesity, it is particularly important to determine what physical activity-related features are important for encouraging adolescent physical activity participation. Identifying these features can help inform local governments and park and recreation departments which physical activity features are important investments for increasing physical activity levels in these vulnerable populations.

#### **Objectives:**

The gold standard method for collecting information on physical activity settings has typically been on-site data collection. However, this can be very costly and time intensive, restricting sample sizes for research studies, and limiting its application to advocacy organizations and others interested in measuring these settings. There is also a lack of validated self-report measures related to parks and trails and the need for future instruments to be developed to address the needs and conditions of low-income minority communities as research has shown park utilization differs by race and ethnicity. Therefore, the purpose of this study was to conduct focus groups with African American and Latino adolescents to guide the development of a self-report survey instrument of park and other physical activity settings characteristics.

#### **Methods:**

In the spring 2010 we conducted focus groups with low-income inner-city African American and Latino 6th, 7th and 8th graders from two purposively selected Chicago elementary schools to help develop self-report measures of neighborhood parks and other physical activity supports characteristics and their frequency and duration of use of these supports. Qualitative data was themed using content analysis techniques.

#### **Results:**

Participants regularly visit 3 different physical activity settings located near where they live. African American participants had access to more local facilities than Latino participants. Male participants were more knowledgeable about the presence and condition of features at these local settings. Male participants were also more likely to take advantage of alternative neighborhood locations (i.e., streets, alleys, abandoned lots, empty parking lots). Both male and female participants cited safety as a major issue for them. Both male and female participants suggested a need for greater supervision (park staff, parents and police officers) and more park district programs at the parks. Results also revealed that males utilized the features of the parks more than female participants. Female participants stated they were not "really interested in the features of the park as much as



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they were about how “people friendly” the park was.” They stated the reason they visit local parks is because their friends go there and there are other “friendly” people that are there-this is what keeps them going back.

### **Conclusions:**

The information obtained from these focus groups was used to develop a self-report park characteristic survey instrument, which will also be presented. Reliability of the survey instrument will take place in September/October 2010. This survey will 1) be a more economical and efficient method for developing reliable measures of park and other physical activity settings characteristics than conducting on-site data collection, and 2) be tailored to those most at risk of obesity (low income minority adolescents).

### **Support:**

This research is funded by The Robert Wood Johnson Foundation





### 45) An Analysis of Perceived Barriers to After Hours Use of Schools in Under-Resourced Communities

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*Tourism, Recreation and Sport Management, University of Florida*

#### **Background:**

Regular physical activity is essential to good health. Children in under-resourced communities are often less active given a lack of access to safe, free or low cost, and convenient recreation and sport facilities. Schools can provide the physical structure and facilities for informal and formal recreation as well as after school, weekend, and summer sport and recreational programming. There is strong support for the increased access and shared use of school recreational facilities. There are barriers, however to shared use. Key perceived barriers among school administrators identified in previous studies include: safety, insurance, security, maintenance, cost, staffing, vandalism, operations, liability, ownership, and scheduling issues. Fear of liability, in particular, has been identified as a primary concern for school administrators and a key barrier.

#### **Objectives:**

The objectives of this study were to measure perceived barriers to shared use of school recreational facilities in under-resourced communities across the nation, and develop a scale to assist in measuring barriers.

#### **Methods:**

A national, online survey of school principals in low-income (determined by school's Free and Reduced Price Lunch (FRL) status) and minority communities (identified through the United States Department of Education National Center for Education Statistics) was conducted. Forty-eight states had schools that met the selection criteria. The instrument was developed utilizing survey items from prior studies, the relevant literature; and was reviewed by a Delphi panel of experts. Perceived barrier items were presented in a 5-point Likert scale, ranging from 1 = "Not at all important" to 5 = "Extremely important." Data were collected in November and December, 2009. The research received Institutional Review Board approval. A total of 360 completed surveys were submitted online from school administrators in 46 states (response rate = 21%). Means were computed for perceived barriers to opening school recreational facilities to the community after school hours. Differences in mean scores were assessed by one-way ANOVA. All analyses were conducted with SPSS Version 14.0. Scale development was accomplished using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) with two separate sample data.

#### **Results:**

The majority of respondents were administrators of public schools ( $n = 357$ ; 99%) in low-income communities ( $n = 346$ , 96%). Most schools were located in African-American (35%) and Hispanic (32%) communities. Sixty-nine percent ( $n = 249$ ) of respondents reported their school recreational facilities being open to the public after hours. Among schools reporting the formal shared use of facilities, only 15% percent responded that they would share the use of their recreational facilities without a formal legal agreement. The highest overall means (mean > 4.0) for perceived barriers to community use were liability (mean = 4.19), safety (mean = 4.16), insurance (mean = 4.16), staffing for maintenance (mean = 4.14), staffing for security (mean = 4.07), staffing for activities and programs (mean = 4.06), cost of running activities and programs (mean = 4.03), and maintenance



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responsibility (mean = 4.00). Barriers with the highest overall mean scores and those significantly associated with decisions to not allow community use were liability (mean = 4.34,  $p = .018$ ), staffing for maintenance (mean = 4.32,  $p = .002$ ), staffing for security (mean = 4.24,  $p = .009$ ), cost of running activities and programs (mean = 4.21,  $p = .004$ ), and maintenance responsibility (mean = 4.12,  $p = .009$ ). Three factors (safety/security, resources, and social support) emerged through EFA. The Kaiser-Meyer-Olkin measure of sampling adequacy was excellent at .884. The final CFA model included 12 observed variables (liability, burglary, vandalism, graffiti, maintenance cost, activity cost, maintenance staffing, activity staffing, space, school support, community support, and controversy) representing the three latent constructs/factors. The final measurement model fit the data adequately ( $\chi^2 = 127.50$ ,  $df = 51$ ,  $\chi^2/df = 2.50$ , SRMR = .063, RMSEA = .09, CFI = .94).

### **Conclusions:**

The variables and constructs identified in this study support those identified in previous studies. For school principals in under-resourced communities across the nation, concern over liability was the primary barrier to opening school facilities for community, recreational use outside of regular school hours. Joint Use Agreements (JUAs) and tort immunity statutes such as recreational user statutes can help alleviate liability concerns, and remove or reduce this barrier to access. The results of this study underscore the importance of informing policy on the importance of tort immunity legislation and JUAs. Advantages of a JUA may include limitations on liability, by splitting the potential liability of sharing the facility, as well as sharing maintenance responsibilities, costs, and staffing; additional barriers of concern to school administrators. Additionally, the study provided empirical evidence of the psychometric property of a perceived barriers scale. This study will assist future researchers in survey and scale development, and policy makers in identifying and addressing key barriers to community access of school recreational facilities.

### **Support:**

This study was supported with funding provided by the Robert Wood Johnson Foundation, Active Living Research program.



### 46) Are There Associations Between Higher Gasoline Prices & Physical Activity of US Teens? Evidence from 2003-2007 YRBSS Data

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**Background:** The prevalence of obesity in the United States remains at an alarming level. The Centers for Disease Control and Prevention (CDC) now refers to the American society as 'obesogenic' - a society that produces obese individuals due to societal norms that encourage increased caloric intake and sedentary behavior. One particularly concerning aspect of this trend is the fact that young children and teens are affected by such norms, and increasingly suffering diagnoses from obesity-related chronic diseases and conditions. Lower physical activity levels, increased access to motorized transportation, and increased time spent in sedentary activities like electronic game usage differentiate this generation of teens from past generations, and these characteristics can, logically, lead to increased BMI levels.

A recent study in the health economics literature (Courtemanche, *Economic Inquiry*, published online March 2010) found that falling real gasoline prices over the 1990s and early 2000s were associated with increased BMI, obesity risk, and lower prevalence of walking/bicycling among the general adult population in the U.S., and suggested that raising gasoline prices via higher gasoline taxes might reduce obesity rates. This study (which was mentioned in *New York Times*) has generated considerable interest in researching the association between gasoline prices and various obesogenic behaviors among different demographic groups, to better understand whether higher gasoline taxes might, indeed, be a potential tool for reducing obesity

**Objective:** Our study investigates the relationship between gasoline prices and physical activity among American teens. The underlying concept is that increased gasoline prices may encourage physical activity by incentivizing teens to substitute away from motorized transportation. At the same time, because higher gasoline prices impose a burden on family budgets, physical activity that require expenses such as fees or uniforms (such as sports team participation) may decline. We utilize secondary, national-level data and exploit the upward spikes in gasoline prices in the 2003-2007 time-period to examine whether these increased gasoline prices appeared to affect self-reported physical activity level of U.S. teens.

**Methods:** Physical activity data were obtained from 2003, 2005 and 2007 CDC Youth Risk Behavior Surveillance System (YRBSS) surveys. The YRBSS surveys are national, school-based surveys of students in grades 9-12, and they focus on high risk behaviors among teens in the areas of dietary behaviors, physical inactivity, accidents and violence, substance use and sexual behaviors,. In addition to the national school-based surveys, state specific surveys provide additional opportunities to monitor the prevalence of these behaviors over time as relevant policy changes are implemented.

We focus on the national school based surveys. The final analytic sample using pooled 2005-2007 data includes approximately 38,000 respondents. Several self-reported indicators of physical activity are used as the outcomes of interest. State-level monthly retail gasoline price data are obtained Energy Information Administration and combined with gasoline tax data from the Federal



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Highway Administration. Multivariate regression analyses are used to evaluate the relationship between various indicators of physical activity and inflation-adjusted, tax-inclusive state-level gasoline prices. Standard errors are clustered at the state-level to account for the multilevel nature of the data.

**Results:** Preliminary regression results indicate positive associations between higher gasoline prices and 'being active for at least 20 minutes daily' and 'being active for at least 30 minutes daily' in models that control for various respondent characteristics and year effects. The results are robust to inclusion of controls for whether and how often the respondent participated in PE in school. However, there is no statistical increase in participation in team sports when gasoline prices increase, -- indeed, that association goes in a negative direction in some models. We plan to carry out additional analyses that additionally control for various state and local characteristics to verify the robustness of our results, though we cannot include 'state fixed effects' in addition to year-effects in our models due to their very strong multicollinearity with state gasoline prices. We also plan to conduct the analyses separately by race-ethnicity to investigate whether the associations hold for minorities.

The study has certain limitation. Apart from the usual problems with self-reporting, the YRBSS does not inform on whether activities were undertaken as a substitute for driving, and whether physical activities occurred within or outside school. The YRBSS also provides relatively limited information on the familial and socio-economic characteristics of the respondents.

**Conclusions:** This study indicates that higher gas prices are positively associated with some forms of physical activities, but not with others such as increased participation in team sports. Further analyses are being conducted to verify the robustness of these results and whether the results are applicable for minorities. These early results appear to lend tentative support to the idea that increasing gasoline prices via increased gasoline taxes may be one potential tool for reducing the obesogenic behavior of physical inactivity among U.S. teens.

**Support:** This research is supported by Grant # 67117 from Active Living Research, RWJF.



### 47) Getting Kids Active in Afterschool: An Examination of Curriculum-Based vs. Standard Physical Activity Instruction

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*Center for Psychological Studies, Project RISE, Nova Southeastern University*

#### **Background:**

Childhood obesity rates and associated health problems have tripled in the past 30 years, especially among minority youth. The role of physical activity (PA) in the prevention of obesity is widely recognized, but PA levels among youth remain unacceptably low. Afterschool programs are emerging as vital locations for physical activity promotion and obesity prevention, given that they can provide up to 1/3 of children's recommended PA levels. However, research on children's levels of PA in this setting reveals conflicting results regarding the types of activities (e.g., teacher led vs. free-play) that promote moderate-to-vigorous exercise in these settings. Furthermore, evidence-based PA instruction appears to have promising potential for obesity prevention when implemented rigorously, but multiple barriers seem to diminish such effects in the 'real world' afterschool setting. In Miami Dade County, FL, The Children's Trust (Trust; a dedicated funding source for children resulting from an independent taxing district receiving its revenue from property tax dollars) funds over 120 community agencies providing afterschool services. The population served by these programs is that at highest-risk for obesity and its related health complications: largely minority (70% Hispanic or Black non-Hispanic/African-American), school-aged (6 to 17 years) youth living in historically underserved urban communities. Over time, the Children's Trust's commitment to health promotion and its collaboration with community partners led them to implement practices such as having a mandatory PA component and fitness outcome assessment in all of its afterschool programs. More recently, the Trust began to consider whether to mandate evidence-based PA instruction. This created the need to gather data that will ultimately guide the policy-determination process.

#### **Objectives:**

The present ongoing study aims to assess the practicality of committing resources to evidence-based curricula intended to promote PA in the afterschool setting. It evaluates the effects of the two types of PA instruction (evidence-based curriculum versus standard instruction) on children's levels of physical activity and cardiovascular health-risk indicators. This study also aims to shed light on the current health status of a large number of low-income, minority children and set the stage for tracking the impact of afterschool program participation in health-related outcomes over time.

#### **Methods:**

This three-wave, quasi-experimental, naturalistic observation study is currently assessing PA levels (using the System for Observing Fitness Instruction Time-SOFIT and accelerometry) and cardiovascular health-risk indicators (VO<sub>2</sub> max estimated by the Progressive Aerobic Cardiovascular Endurance Run (PACER), Body Mass Index (BMI), and bioelectrical impedance analysis) among 800 children attending randomly-selected afterschool programs using either evidence-based (e.g., SPARK; n = 20 sites) or standard (n = 20 sites) physical activity instruction. In addition, quality of PA instruction and SPARK implementation fidelity is also assessed. Data collection is ongoing (estimated date of completion is November 2010).



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### Results:

To date, 21 sites have been visited (11 using SPARK and 10 using standard PA instruction). Preliminary results indicate that afterschool participants are primarily Hispanic (65.6%), elementary school-aged (83.1%) children attending the afterschool program an average of 5 days per week (89.5%). Out of the children evaluated, 49.9% are considered overweight or obese (according to CDC classification for age and gender; BMI > 85<sup>th</sup> percentile). Children performed more moderate-to-vigorous physical activity,  $\chi^2(1) = 47.18, p < .001$  under the standard PA condition versus the curriculum-based (SPARK) instruction. The majority of time during both curriculum-based and PA instruction was spent in game play (50.13% and 42.17%, respectively), followed by management (28.60% and 26.22%, respectively). Physical activity promotion and quality of instruction did not differ significantly for SPARK and non-SPARK sites. However, the structure of the lesson did become more lax as the Spring semester progressed  $F(2,59) = 4.58, p < .01$  for all programs, and PA levels for children in SPARK programs implementing the curriculum with higher levels of fidelity had a tendency to be higher,  $r = .37, p = .13$ . Upon completion of the study, the effects of curriculum-based instruction will be evaluated in the context of random effects regression models to properly adjust for the nesting of youths within facilities. Covariates that are associated with intervention group membership and the outcome of interest will be statistically controlled in all models, either through standard methods or by using a propensity score model.

### Conclusions:

Upon its completion, the present study will yield important results regarding the impact of using evidence-based PA instruction in the afterschool setting. Preliminarily, it appears that when it comes to PA instruction in afterschool, either less structured activities or well-implemented evidence-based practices could be the key to promoting higher PA levels and greater health and fitness for school-aged children.

### Support:

Support for this study is provided by the Robert Wood Johnson Foundation Active Living Research and The Children's Trust in partnership with Nova Southeastern University



### 48) Parental Influences on Children's School Commute Choices

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#### **Background:**

In the United States, walking and biking to school has declined as more parents choose to drive their kids to and from school. This shift from walking to driving has deprived many children of an opportunity for daily physical exercise, increased traffic congestion and decreased air quality near schools. Recent research shows that one in two children are currently driven to school even if they live within a mile of the school and that major factors influencing this preference for driving are parental attitudes, perceptions, convenience and employment-related time constraints.

Federally-funded Safe Routes to School (SRTS) programs encourage walking and biking through encouragement, enforcement, and education programs, and infrastructure improvements, such as additional sidewalks and crosswalks. The federal funding also requires an evaluation component consisting of student hand-raising surveys and parent mail-in surveys. Unfortunately, the parent survey evaluation tool developed for the model federal SRTS program is too limited in scope and clarity to provide useful information and feedback to program managers.

#### **Objectives:**

The primary objective of this project was to fill a research gap by gathering data about how parental attitudes and time constraints affect decisions about their child's transportation mode to school and better understand their reasons behind their mode choices using focus groups. A secondary objective was to test and evaluate the usefulness of focus groups in collecting data to collect data and conduct program evaluation for SRTS programs.

#### **Methods:**

The investigators conducted focus groups with parents at four elementary schools with SRTS programs in Portland in fall 2009 and winter 2010 to better understand reasons for driving and identify policy solutions which address parents' concerns. Schools were paired into two groups and matched for Socio-Economic Status (SES) and similar neighborhood context, including land use, street connectivity, presence of sidewalks and safe bicycle routes to the school. The parents were recruited by each school's parent organization. Between 12 and 15 parents participated in each focus group. The sessions were held at each school in the early evening, lasted approximately 90 minutes, and were facilitated and recorded by professionals from Portland State's Survey Research Lab. Participants received a gift card for their time; food and child care were provided.

#### **Results:**

Parents in all four focus groups reported higher rates of active commuting than the national average, possibly because of Portland's strong biking and walking culture and relatively long history of Safe Routes to Schools programs. A full range of transportation modes for the school commute was represented by the participants. Parents in this study indicated that they use multiple travel modes within a day, week or year, depending on a range of variables, which provides more nuanced information than previous studies that generally classify families as using or not using an active commute mode. While the results confirm findings from previous studies that distance, family



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schedules, and perceptions of traffic and neighborhood danger and weather impact parents' decisions about travel mode, this study also found that temporal factors, such as weather, had a bigger influence on the day-to-day commute choice. In addition, the data showed a difference in travel mode to and from school among many participants. This reflected a number of family variables such as work schedules, presence of younger siblings in the family, and shared parenting responsibilities. Finally, while the parents highlighted convenience as an important influence, they did not necessarily find driving more convenient than active commute modes, especially if they lived closer to the school when walking or biking would be faster and easier.

### **Conclusions:**

The data and outcomes will help improve SRTS programs and address acknowledged gaps in our understanding of how the various parental attitudes and perceptions affect their children's travel mode to and from school. Specifically, the number and variety of factors that influence the parents' decisions about travel mode indicate that SRTS programs need to work on multiple fronts to be effective. The difference in responses between the higher and lower SES schools indicates the need to customize programs to the family needs of the school rather than a one-size fits all program that is administered uniformly across a district or a city. In addition, this study provided detailed data about parental attitudes, influences and constraints as they affect their choice of travel mode for their children's trips to and from school that have not been captured by the standard mail surveys traditionally used for SRTS program evaluation and will help inform future program design.

### **Support:**

This research received support from the Oregon Transportation Research and Education Consortium and the City of Portland Bureau of Transportation.





### 49) Important Park Site Attributes for Physical Activity: Differences in Respondent Perceptions by Race/Ethnicity, Gender, and Age

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#### **Background:**

Public parks are increasingly recognized as important venues for physical activity and public health. However, opportunities still remain to improve the use of parks for physical activity. Therefore, a greater understanding of what it is about park settings that attracts and encourages their active use will improve the ability to facilitate park-based physical activity. Several studies have begun to document such environmental features through observations and environmental audits. However, it is also important to understand visitors' perceptions of site attributes that are important for their physical activity. Furthermore, as variations in park use and physical activity emerge across demographic variables such as race/ethnicity, gender, and age, differences in perceptions of important site attributes that may influence park-based activity need to be examined.

#### **Objectives:**

The purpose of this study was to examine differences in the perceived importance of park site attributes for physical activity by respondents' race/ethnicity, gender, and age.

#### **Methods:**

Onsite questionnaires were administered to park visitors at four parks in Kansas City, Missouri in July-August, 2009. Visitors 18 years and older were systematically sampled across daylight hours (7am - 8pm) in each park resulting in a final sample of 474 respondents (60.5% response rate). The four-page self-administered questionnaire included questions pertaining to site attributes important for park-based physical activity and visitor demographics, among other variables. Seventeen site attributes based on previous research were rated on a 5-point scale (1=very unimportant, 5=very important) for their importance when choosing a park for physical activities.

Analysis of covariance (ANCOVA) was used to compare the perceived importance of the 17 site attributes first by race/ethnicity, then by gender, and finally by age, each time controlling for the effect of the other two demographic variables in the analyses. Bonferroni's multiple comparison adjustment of the alpha level was employed to reduce the family-wise error of the separate ANCOVAs. Each of the Bonferroni corrected significant ANCOVAs was followed by a Sidak post hoc test to determine where the statistically significant differences were found.

#### **Results:**

Slightly more than half (53.5%) of respondents were male. Respondents ranged in age from 18 to 79 years ( $M=38.8$ ) and were grouped into four categories: 18-29 (29.3%), 30-39 (31.7%), 40-49 (17.0%), and 50+ (22.1%). 75.5% of respondents had an annual household income less than \$75,000 and 51.9% less than \$50,000. The majority of respondents were White non-Hispanic/Latino (66.2%), followed more distantly by Hispanic/Latino of any race (14.9%) and Black (11.3%). For simplicity, White non-Hispanic/Latino will be referred to as White, and Hispanic/Latino of any race will be referred to as Hispanic. Of the 17 site attributes, respondents rated feeling safe from crime ( $M=4.47$ ) as the most important attribute for physical activity, followed by beauty

( $M=4.25$ ), maintenance of facilities ( $M=4.24$ ), feeling safe from injury ( $M=4.23$ ), and ease to get there ( $M=4.23$ ). Interestingly, sport fields were rated as the least important site attribute for physical activity, although these were still considered moderately important ( $M=3.35$ ).

When comparing the importance of site attributes by race/ethnicity while controlling for age and gender, eight differences emerged. Specifically, Black and Hispanic respondents rated the following attributes as more important than White respondents: cleanliness ( $F=9.75$ ,  $p<.001$ ;  $M_{\text{Black}}=4.54$ ,  $M_{\text{Hispanic}}=4.46$ ,  $M_{\text{White}}=4.02$ ), sport fields ( $F=19.93$ ,  $p<.001$ ;  $M_{\text{Black}}=3.78$ ,  $M_{\text{Hispanic}}=4.02$ ,  $M_{\text{White}}=3.09$ ), playgrounds ( $F=18.46$ ,  $p<.001$ ;  $M_{\text{Black}}=4.16$ ,  $M_{\text{Hispanic}}=4.18$ ,  $M_{\text{White}}=3.36$ ), picnic areas ( $F=14.14$ ,  $p<.001$ ;  $M_{\text{Black}}=4.08$ ,  $M_{\text{Hispanic}}=4.16$ ,  $M_{\text{White}}=3.46$ ), parking ( $F=5.64$ ,  $p=.004$ ;  $M_{\text{Black}}=4.26$ ,  $M_{\text{Hispanic}}=4.23$ ,  $M_{\text{White}}=3.88$ ), and being near water ( $F=5.34$ ,  $p=.005$ ;  $M_{\text{Black}}=3.88$ ,  $M_{\text{Hispanic}}=3.92$ ,  $M_{\text{White}}=3.51$ ). Likewise, Hispanic respondents also rated lighting ( $F=7.39$ ,  $p=.001$ ;  $M_{\text{Hispanic}}=4.26$ ,  $M_{\text{White}}=3.83$ ) and restrooms ( $F=5.54$ ,  $p=.004$ ;  $M_{\text{Hispanic}}=4.28$ ,  $M_{\text{White}}=3.85$ ) as more important than White respondents. Differences in gender emerged in five of the site attributes when controlling for race/ethnicity and age. Males indicated that sport fields were more important for physical activity than females ( $F=8.36$ ,  $p=.004$ ;  $M_{\text{male}}=3.51$ ,  $M_{\text{female}}=3.19$ ). In contrast, female respondents rated feeling safe from crime ( $F=21.49$ ,  $p<.001$ ;  $M_{\text{male}}=4.28$ ,  $M_{\text{female}}=4.65$ ), feeling safe from injury ( $F=29.78$ ,  $p<.001$ ;  $M_{\text{male}}=3.98$ ,  $M_{\text{female}}=4.45$ ), ease to get there ( $F=7.74$ ,  $p=.006$ ;  $M_{\text{male}}=4.11$ ,  $M_{\text{female}}=4.33$ ), and lighting ( $F=8.21$ ,  $p=.004$ ;  $M_{\text{male}}=3.80$ ,  $M_{\text{female}}=4.05$ ) as all more important than male respondents. Finally, when controlling for the effects of race/ethnicity and gender, no differences in the importance of the site attributes emerged across the four age groups.

### Conclusions:

This study contributes to a growing body of research examining the influence of park behavior settings on active living by providing a greater understanding of park visitors' perceptions of important site attributes for physical activity. The differential ratings of site attribute importance by race/ethnicity and gender may help to understand and interpret physical activity patterns observed in previous research and these also have implications for the facilitation of park-based physical activity. Future studies are needed to further examine the association between important attributes identified by park visitors and actual physical activity behavior.

### Support:

This study was supported by the University of Missouri Research Council, the Kansas State University Office of Research, and the Kansas City Parks and Recreation Department.



### 50) A “Bikeability” Planning Tool: Using Research to Guide Urban Design Strategies for Active Travel

*Meghan Winters, MSc<sup>1</sup>, Michael Brauer, PhD<sup>2</sup>, Eleanor M. Setton, PhD<sup>3</sup>, Kay Teschke, PhD<sup>1</sup>*

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#### **Background:**

Cycling is a sustainable transportation option with great health benefits over car travel, including lower air pollution, obesity and chronic diseases, and increased fitness. Moreover, since bicycle travel is faster and more efficient than walking, while nearly as accessible and economical, it may be a more reasonable substitute for auto travel on trips beyond a kilometer. Yet cycling rates in North American cities are low compared to certain European cities (1-2% modal share, compared with 15-30%), a disparity explained in part by differences in urban form and cycling infrastructure. Evidence from our research and that of others indicates that aspects of the built environment have a significant influence on decisions to cycle instead of drive. Geospatial data for these environmental features are increasingly available. Those involved in the promotion of walking have capitalized on the powers of geographical analysis, creating walkability indices and the popular online tool “WalkScore”. However, walkability does not equal bikeability. And to date, there has been little effort to use existing data and knowledge to define and map “bikeability”. We undertook this project, in partnership with representatives from the regional travel authority, cycling advocacy groups, and health authorities, to employ empirical evidence to build a practical planning tool to stimulate cycling.

#### **Objectives:**

Our goal was to build a tool to identify areas that are more and less conducive to cycling, based on the on-the-ground conditions.

#### **Methods:**

We developed a bikeability index and used GIS to map the index across the Metro Vancouver Region. Results of an opinion survey, a travel behavior study, and focus groups were used to identify the components of the index and their relative importance. Pertinent geospatial data layers were scored and combined using a flexible weighting scheme to create a composite map highlighting both high and low bikeability areas.

#### **Results:**

The bikeability index was comprised of four factors that consistently influenced cycling: topography; bicycle facilities; street connectivity and land use. For mapping purposes, we created corresponding metrics: slope; density of bicycle facilities; connectivity of roads suited to cycling (local streets and off-street paths); and density of destination locations. By combining data layers of these metrics we generated a high-resolution bikeability surface (Figure 1) for the region, where green depicts bike-friendly areas and red depicts areas where cycling conditions need to be improved. Built environment interventions for specific locations are informed by evaluating scores for the four individual component layers. For example, certain areas in the region have high scores for topography (i.e., no hills), and a reasonably high density of shops and other destinations, but score low in terms of the density of bicycle facilities. Such areas could be prioritized for new bicycle routes in order to promote bicycle travel.

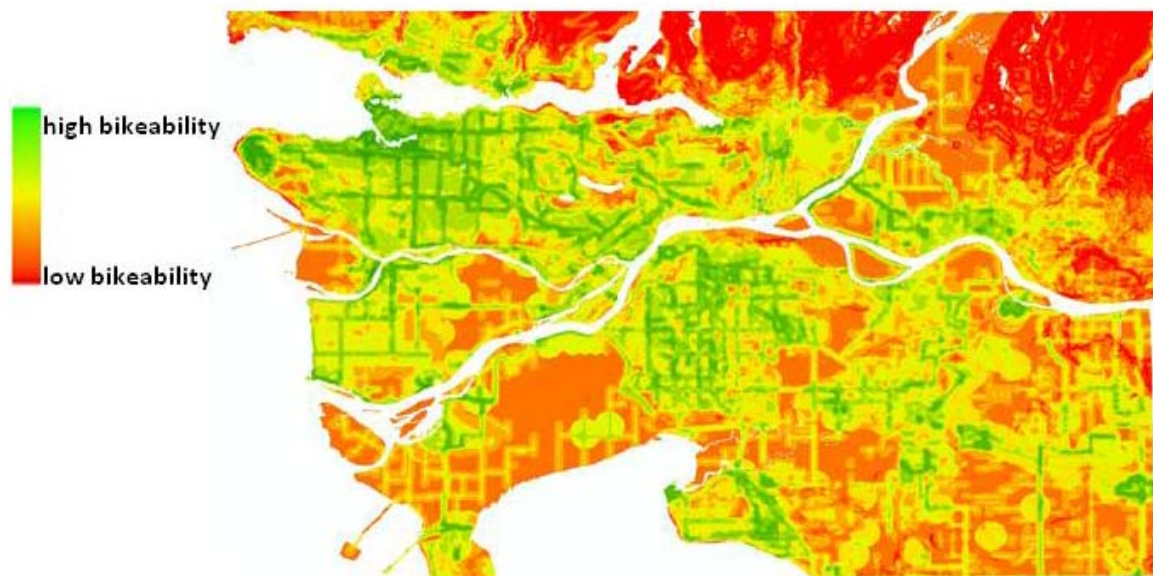
### Conclusions:

Mapping bikeability provides a powerful visual aid to identify zones that need improvement to support healthy travel choices. It is an evidence-based tool that presents data in a user-friendly way for planners and policy makers. The overall bikeability score and its four component scores can guide local action to stimulate changes in cycling rates. A key strength of the system we designed is that it relies on empirical evidence about factors influencing cycling and uses widely available data types, thus facilitating easy application in other cities. Furthermore, the flexible parameters and weighting scheme enable users elsewhere to tailor it to evidence about local preferences and conditions.

### Support:

Heart and Stroke Foundation and Canadian Institutes of Health Research

Figure 1: Bikeability map for Metro Vancouver region





### 51) A Multilevel Investigation on the Socio-demographic and Urban Neighborhood Effects on Out of School Physical Activity among Minority Adolescents

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#### **Background:**

Nearly 35% of youth in the US fail to meet the minimum physical activity (PA) guidelines and another 14% are completely inactive. The observed increasing prevalence of obesity and overweight is particularly striking for minority adolescents for their exposure to high levels of life stress, poverty, and violence. Thus, research efforts must focus on identifying environmental factors that contribute to inactivity, particularly urban inner-city and minority populations who are more likely to suffer adverse health consequences. Behavior-specific and context-specific ecological models assume that behavior can be better predicted when there is greater correspondence between a specific behavior outcome and the specific environmental and personal variables hypothesized to be associated with that behavior. A number of reviews have examined links between the built environment and people's physical activity. Among those studies, neighborhood safety (perceived and objective measures) and aesthetic qualities of the built environment appear to be associated with PA patterns. However, the literature is not consistent on exactly how aspects of the neighborhood environment affect PA, particularly on results that were confounded by socioeconomic status (SES) in the urban setting. For example, an urban environment was associated with a greater number of sidewalks, which were a predictor of walking for exercise. Yet these sidewalks also indicated an area for high crime, low SES, and unemployment, which are deterrents for leisure time PA.

#### **Objectives:**

Few studies have simultaneously assessed individual sociodemographic factors, and both the physical and social dimensions of neighborhood environment and their associations with MVPA in an urban setting. Furthermore, much less emphasis has been placed on research specific to urban adolescents. It is also unclear how commute distance contributes to neighborhood-MVPA associations. The purpose of this study is to examine the association of individual and neighborhood characteristics with physical activity, particularly out-of-school MVPA, among a sample of minority adolescents living in an urban environment. Given the Healthy People 2010 goals to eliminate health disparities in terms of higher prevalence of physical inactivity, and recent recommendations to focus on environmental determinants of physical activity, our study is important to elucidate this relationship.

#### **Methods:**

Study participants were drawn from the Baltimore Active Living Teens Study (BALTS), a cross-sectional study. Both individual-level and neighborhood-level data were obtained. The individual level data includes participants' socio-demographic data, current health status, the MVPA, and parents' education level. Geographic Information System (GIS) - based neighborhood-level measures include five categories: 1) housing and community development; 2) violence and crime; 3) pleasantness; 4) workforce and Economic Development; and 5) transportation time to work. Address geo-coding were conducted with ArcGIS 9.3. All statistical analyses were conducted using

SAS version 9.2. Linear mixed effects models were employed to study the joint effects of individual level and neighborhood level factors on MVPA. Neighborhood was treated as a random intercept in the linear mixed effects models to control for the intra-class correlation.

### Results:

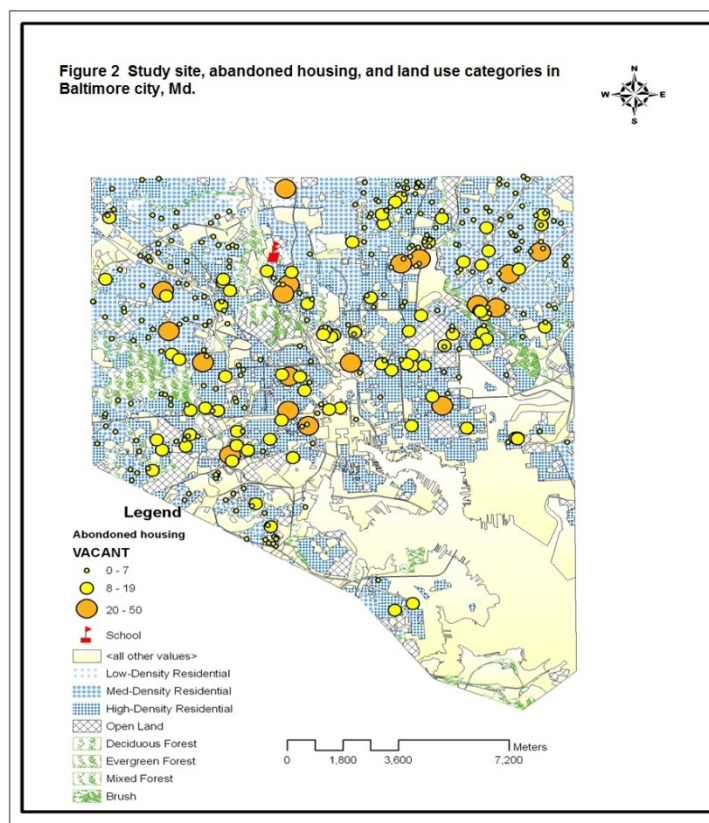
The study participants consisted of adolescents ( $n=297$ ) between 14 and 18 years of age (mean =15.7,  $SD=1.21$ ), with 69% Black and 60% female. Bivariate and multivariate analyses show that younger adolescents are more active than older adolescents. Females spend 1.27% less leisure time for MVPA than males do ( $P=0.01$ ). MVPA is also affected by neighborhood-level variables. After controlling for individual-level characteristics, the percentage of the population with travel time more than 30 minutes ( $P<0.001$ ) and median house sale price ( $P=0.04$ ) are both negatively related to adolescents' MVPA; while abandoned property rates are positively related to MVPA ( $P=0.05$ ).

### Conclusions:

The inner-city paradox indicates the complex interaction between built environment infrastructure and social-demographic factors. As communities are built or rebuilt, the design standard should be geared to the human, rather than the automotive.

### Support:

This study was supported by a grant (63530) from the Robert Wood Johnson Foundation's Active Living Research Program.





### 52) Using Legal Research to Overcome Barriers to Safe Routes to School

**Sara Zimmerman, BA, JD**

*The National Policy & Legal Analysis Network to Prevent Childhood Obesity (NPLAN), Public Health Law & Policy*

**Background:**

Children, particularly those in low-income and minority communities, often lack opportunities for regular physical activity, resulting in higher rates of obesity and health disparities.<sup>1,2</sup> Safe Routes to School (SRTS) programs can help children incorporate physical activity into daily routines.<sup>3,4</sup> Research has identified fear of liability as the primary institutional barrier to SRTS programs.<sup>5</sup> This presentation will discuss research into the realities behind the fear of liability; debunk myths; and provide practical conclusions that will help advocates who want to increase children's physical activity.

**Objectives:**

This legal research project had three objectives:

1. To understand the legal landscape relating to SRTS and liability.
2. To make this legal arena accessible and intelligible to non-lawyers.
3. To increase physical activity in children by debunking liability fears related to SRTS.

**Methods:**

As part of a comprehensive effort to address the problem of childhood obesity, the National Policy and Legal Analysis Network to Prevent Childhood Obesity (NPLAN) develops tools to translate research on obstacles to physical activity into community action on a national scale. NPLAN is a national project of the Robert Wood Johnson Foundation's childhood obesity initiative, and is housed within Public Health Law and Policy (PHLP), a legal research and technical assistance center based in Oakland, California. NPLAN supports the innovation and implementation of policies to reverse childhood obesity by empowering advocates and decision-makers with practical legal and policy tools. It provides legal research, model policies, fact sheets, toolkits and technical assistance aimed at increasing the capacity for advocates to create sound, innovative policy change in their communities.

To understand the legal basis for liability related to SRTS, NPLAN conducted an in-depth legal analysis of liability regimes as related to SRTS in ten states. The ten states selected were California, Georgia, Illinois, Kentucky, Louisiana, New York, Oklahoma, Texas, and Virginia, plus the District of Columbia. The states represented different geographical areas, and presented an array of different approaches to liability, with some, for example, having very strong governmental immunities protecting school districts, and others having comparatively weak immunity. The research provided a basic overview of liability for SRTS programs for school districts, volunteers, and non-profit organizations. NPLAN also consulted with experts in the field, such as the Safe Routes to School National Partnership, numerous local active transportation organizations, childhood obesity advocates and lawyers, and others, to obtain additional feedback on the research and provide real world insights. In addition to strictly legal research, NPLAN also explored the real and perceived risk of injury in SRTS programs.



## POSTER SESSION ABSTRACTS

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### Results:

NPLAN identified both differences and commonalities in how states' liability regimes affect SRTS. As a general matter, NPLAN concluded that fears of liability were often overblown. In addition, NPLAN determined how school districts, nonprofits, and volunteers could protect themselves against liability by acting with reasonable care and having insurance, developing a list of recommendations to help SRTS programs avoid acting negligently. We determined that there was a need for more information about the reality of liability and practical tools explaining how to overcome these fears. To achieve this goal, we developed factsheets and tools to provide people with an understanding of the reality of liability dangers, so that liability could pose less of a threat to SRTS programs. Areas for additional research were also identified, including further investigation of the extent of coverage of the most widely available insurance policies for schools and nonprofit organizations.

### Conclusions:

By better comprehending the reality behind liability concerns, school districts, nonprofit organizations, and advocates can understand the very limited nature of any risk, and take steps to reduce risk of liability and embrace SRTS programs.

### Support:

Support for this project was provided by a grant from the Robert Wood Johnson Foundation. Significant portions of the research were conducted by Professors Sachin Pandya and Peter Kochenburger of the University of Connecticut School of Law's Insurance Law Center, with input from NPLAN, which also conducted independent research.

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