



## CONCURRENT PRESENTATION ABSTRACTS

### Intervention Evaluations

#### **Evaluating the Impact of Implementing a Public Bicycle Share Program on Utilitarian Cycling: The Case of BIXI in Montreal, Canada**

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#### **Background:**

Interventions involving changes to the built environment that address the environmental conditions underlying low levels of physical activity can result in meaningful population level increases in physical activity. Although utilitarian cycling is related to characteristics of the built environment, limited research has evaluated whether or not built environment interventions can impact utilitarian cycling. BIXI (Bicycle-taXI) is a public bicycle share program first implemented in Montreal, Canada between May 12th 2009 and November 30th 2009 and is an example of a built environment intervention. BIXI increases accessibility to cycling by making available at low cost 5000 bicycles throughout 450 bicycle docking stations located in Montreal's central and more urbanized neighborhoods.

#### **Objectives:**

This study examined the impact of implementing the BIXI public bicycle share program on the likelihood of utilitarian cycling in the population of a large urban area.

#### **Methods:**

A pre-test post-test design coupled with spatial mapping of the location of bicycle docking stations was used. Two population-based samples of adults participated in telephone surveys. The sampling plan involved random digit dialing for individuals residing on the Island of Montreal and 25% oversampling of telephone numbers corresponding to residential addresses where BIXI docking stations were implemented. Sampling fractions were 0.001 for both surveys. Pre-implementation data collection occurred between May 4th and June 9th 2009. Post-implementation data collection occurred between October 8th and December 12th 2009. The pre- and post-implementation surveys consisted of 2001 (Mean age=46.2 years, 51.2% female) and 2502 (Mean age=44.4 years, 58.5% female) adults and response rates were 32.6% and 34.6%, respectively. There was minimal overlap between surveys. The dependent variable was a dichotomous indicator of utilitarian cycling during the previous week. The primary independent variables were survey period and proximity to BIXI docking stations. Control variables included mixed land use, street connectivity, and sociodemographic characteristics. A four step logistic regression was performed on the combined data sets (n=4503): (1) Survey period: a dichotomous variable distinguishing pre- vs. post-implementation surveys; (2) Proximity to BIXI docking stations: an ordinal variable representing distances between home and the nearest BIXI docking station from 1m-1000m, 1001m-5000m, and greater than 5000m, (3) interactions between survey period and proximity to BIXI docking stations; and (4) statistical adjustments for land use, street connectivity age, sex, and education. Post stratification weighting for age and sex was applied to all analyses. Since docking stations were implemented in areas where people were already more likely to perform utilitarian cycling, we hypothesize that significant interactions (step 3) rather than main effects of survey period or proximity to docking stations were evidence that implementation of the BIXI public bicycle share program results in changes in the likelihood of utilitarian cycling.



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#### **Results:**

Descriptive analyses showed that 8.0% (n=139) and 9.4% (n=186) of respondents had engaged in utilitarian cycling in the pre- and post-implementation survey periods, respectively. In models including all variables, the likelihood of utilitarian cycling was similar across pre to post-implementation periods (OR=0.53, 95% CI: 0.27, 1.03). However, compared to living more than 5000m away from a BIXI docking station, presence of a BIXI docking station within 1000m from home was related to greater likelihood of utilitarian cycling (OR=2.37, 95% CI: 1.45, 3.87), while living between 1001m-5000m was not (OR=1.54, 95% CI: 0.91, 2.59). Interaction terms revealed that in the post implementation survey period, the likelihood of utilitarian cycling for individuals living within 1000m of a BIXI station were 3.22 (95% CI: 1.53, 6.80) while the odds were 2.32 (95% CI: 1.06, 5.09) for individuals residing between 1001-5000m from a BIXI station. Other factors associated with utilitarian cycling were being male (OR=1.69, 95% CI: 1.33, 2.16), aged between 35-44 years (OR=0.62, 95% CI: 0.39, 0.99), 45-54 years (OR=0.51, 95% CI: 0.31, 0.82), 55-64 years (OR=0.32, 95% CI: 0.18, 0.59), 65 years or older (OR=0.17, 95% CI: 0.07, 0.42), having a trade school (OR=2.43, 95% CI: 1.41, 4.18), college (OR=1.84, 95% CI: 1.16, 2.93) or university (OR=2.92, 95% CI: 2.00, 4.25) education, and being on a work leave (OR=0.54, 95% CI: 0.32, 0.92).

#### **Conclusions:**

During the first season of BIXI there was no increase in utilitarian cycling in the overall population. This is expected because BIXI was not implemented on the entire Island of Montreal. The interaction between survey period and proximity to BIXI docking stations showed a significantly greater likelihood of utilitarian cycling among individuals living closer to BIXI docking stations in the post-implementation survey period. These findings provide preliminary evidence that implementation of public bicycle share programs can increase the likelihood of utilitarian cycling. Extension through ongoing surveillance and replication in other sites is warranted.

#### **Support:**

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### Intervention Evaluations

#### Impact of a Pilot Walking School Bus Intervention on Children's Pedestrian Safety Behaviors

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#### **Background:**

Walking School Buses (WSB) are groups of children, led to and from school by parents or other adults, in which children are picked up at designated "bus stops." Pedestrian safety should be taught and modeled by the adults on the walk to school. WSB programs have been reported to increase children's active commuting to school and physical activity; however, the impact on children's pedestrian safety behaviors has not been well studied.

#### **Objectives:**

To conduct a pilot evaluation of a WSB program's impact on children's pedestrian safety behaviors.

#### **Methods:**

We conducted a group randomized controlled trial among 4th grade students in eight low socioeconomic status, elementary schools in Houston, TX. The 149 enrolled 4th graders were ethnically diverse. The intervention was a WSB program led by study staff available 5-days/week. Schools were matched by race/ethnicity and % qualifying for free/reduced lunch, then randomized to intervention or control conditions. Outcomes were measured prior to the intervention (Time 1) and during week 5 of the intervention (Time 2). We measured children's pedestrian safety behaviors with a previously validated instrument. Children were observed for the following five behaviors considered important to pedestrian safety: crossed at a corner or crosswalk, crossed with an adult or safety patrol, stopped at the curb, looked left-right-left, and walked (not ran) across the street. Children were classified as walking with a WSB program based on wearing the distinctive WSB reflective safety vests provided each day to the WSB students. We conducted observations before school without interacting or deliberately influencing the children's or adults' behaviors. No individual sociodemographic information was collected and the data reflect the behaviors of child pedestrians of any grade level approaching a major intersection at the study schools (n=1252 at Time 1 and n=1296 at Time 2). To determine differences for the global pedestrian safety behavior score (scale of 0-5), we used a linear mixed-model regression analysis with school as a random and time as independent effects. To determine differences for each of the individual pedestrian safety behaviors, we used generalized mixed model analyses with school as a random and time as independent effects. A planned sub-analysis at Time 2 compared WSB students versus non-WSB students at the intervention school.

#### **Results:**

The linear mixed-model regression yielded no significant main effects for the WSB intervention on the school-wide global pedestrian safety behavior score. The generalized mixed model analyses yielded significant group by time effects for the WSB intervention on three of the individual pedestrian safety behaviors: (1) crossing at a corner or crosswalk, children at the intervention school increased by 16.4% while children at the control school increased by 4.1% (p<0.001); (2) crossing with an adult or safety patrol, children at the intervention school decreased by 0.5% while children at the control school decreased by 9.9% (p<0.001); and (3) stopping at the curb, children at the intervention school decreased by 4.6% while children at the control school increased by 19.5% (p<0.001), although the proportion exhibiting the behavior at Time 2 was similar between groups. Among students at the



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intervention school at Time 2, students who were part of a WSB had higher global pedestrian safety behavior scores than non-WSB students (4.6 +/-0.6 vs. 3.2 +/- 0.9,  $p < 0.0001$ ).

#### **Conclusions:**

A pilot WSB program intervention targeted at 4th grade students had no effect school-wide to improve a composite indicator of children's pedestrian safety behaviors, although a sub-analysis suggested that the WSB was associated with higher scores among WSB-participating students at the intervention school at Time 2. Tertiary analyses revealed preliminary evidence of influence on certain individual indicators school-wide, although caution needs to be exerted on the possibility of enhanced Type I errors. Further work is necessary to improve specific pedestrian safety behaviors through the WSB program and provide a more targeted, well-powered evaluation.

#### **Support:**

RWJF Active Living Research (63773), NCI (1R21CA133418 and 1K07CA131178), and USDA Cooperative Agreement (6250-51000-047)



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#### Family Fitness Zones Increase MVPA

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#### **Background:**

Many communities and organizations would like to improve community parks to increase physical activity, yet the impact of such improvements is seldom evaluated. Working under the leadership of The Trust for Public Land (TPL) and with funding from Kaiser Permanente, the Community Redevelopment Agency of Los Angeles installed 30 fitness zones throughout Los Angeles County. Fitness Zones are easy-to-use outdoor gyms designed to promote general health within a park setting by creating a supportive, accessible, structural, and social environment for getting physically fit. Fitness Zones consist of durable, weather- and vandal-resistant exercise equipment for strength training and aerobic exercise. The equipment needs no electricity and is appropriate for those 13 years and older of all fitness levels. We evaluated the impact of the Fitness Zone equipment in 6 county parks and 6 city parks that served a wide range of population groups. Within a 1-mile radius around the parks, the average percentage of households in poverty was 29.3% (range 6.8% to 61.5%); average population density was 40,964 persons (range 7581-72,292), percent Latino was 59% (range 19.1-97.3%) and percent African American was 18.9% (range 0.3-68.6%). Park size observed averaged 13.2 acres (range was 1-29).

#### **Objectives:**

Our objectives were to answer the following questions: 1) How well is the TPL fitness equipment used after installation? 2) Which age, gender, race/ethnic groups use it, how often do they use it, and do they use it correctly? 3) Do more people use the parks (including the Fitness Zones and other activity areas in the park), and are park users more physically active than to (1) before the equipment was installed and (2) in parks without Fitness Zone equipment.

#### **Methods:**

We used SOPARC (System for Observing Physical Activity and Recreation in Communities) to assess the use of the entire park prior to the installation of the fitness equipment by observing 3 times per day (morning, noon, late afternoon) on 4 days, including 2 weekdays and the 2 weekend days. After the fitness equipment was installed, we measured park use during two different follow-up periods (winter 2009/10 and spring 2010). Once the equipment was installed, we conducted 10 hourly observations of the Fitness Zone area between the hours of 7:30AM to 6:30PM on the four days. Additionally, we surveyed general park users before (baseline) and after the equipment was installed and surveyed fitness zone users after the equipment was installed.

#### **Results:**

Across three waves of observations, we counted 23,557 people in 12 parks, including 2,545 in the fitness zones; we also interviewed 2,637 people, including 722 in the fitness zones. Across the 12 parks, the Fitness Zone equipment was used throughout the day, with peaks from 9:30-11:30AM and 3:30-5:30PM. Six of the 12 parks experienced an increase in park use during the follow-up periods. The increases were concentrated in 4 city parks and 2 county parks, primarily those with a larger population density. Compared to baseline, overall park use increased 16% during the first follow-up and 3% during the second.



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A greater percentage of parks users used fitness zone equipment (and the fitness zone) in smaller parks compared to larger parks. Fitness Zones attracted more new users (i.e., first time park use in the previous 6 months) to parks than other park areas. Fitness Zone users reported coming to the park more frequently and engaging in more exercise sessions per week than other park users. Losing weight was the most common reason reported for using the fitness equipment. Not all the equipment pieces/types were used equally; the dual pendulum and the ski machine were used most and the leg curl and horizontal bars the least.

People in Fitness Zones engaged in substantially more moderate to vigorous physical activity (MVPA) than those in other park activity areas (66% vs 31% at first follow-up and 72% vs 35% at the second follow-up). Additionally, the percentage of people engaging in moderate to vigorous physical activity (MVPA) increased, even in park areas excluding the fitness zone. For non-fitness zone users, compared to baseline, MVPA increased by 12% at the first follow up and 10% at the second follow up.

#### **Conclusions:**

Adding Fitness Zones appear to attract new park users and to increase the proportion of park users that engaged in MVPA, even in areas beyond the fitness zone. Overall, it appears that Fitness Zones had the greatest impact in parks in densely populated areas and in smaller parks that had few other facilities and amenities.

#### **Support:**

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