

**THE PITTSBURGH PARKS PRESCRIPTION PROGRAM PILOT STUDY: A
SCHOOL-BASED APPROACH TO PREVENTING CHILDHOOD OBESITY**

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ABSTRACT

School-based, park-focused obesity prevention programs can be a creative solution to the rise in childhood and adolescent obesity rates in the last three decades. Studies have identified numerous physical and mental health benefits connected to physical activity and the outdoors. Several parks prescription programs have been developed and implemented to encourage youth to become more physically active by using their local parks. The Pittsburgh Parks Prescription (Rx) is a school-based pilot program delivered in two gym class settings in Pittsburgh's Arsenal Elementary and Middle Schools. The program is significant to public health in its aims at increasing knowledge of local parks, desire to utilize park systems, and self-reported physical activity in parks. A review of successful school-based obesity prevention and parks prescription programs revealed a common ecological design. Interviews and small group discussions were held with key program informants to inform improvements for the Pittsburgh Parks Rx program. In response, proposed modifications were made to expand reach, increase flexibility, enhance sustainability, and integrate the Pittsburgh Parks Rx into existing programs.

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PREFACE

I would first like to thank the Pittsburgh Parks Conservancy and Children's Hospital of Pittsburgh, for without them this thesis would not have been possible. I would also like to thank my mentor, Anne Marie Kuchera for introducing me to the Pittsburgh Parks Rx and providing me with unlimited support and guidance throughout my professional career. Thank you to my committee members, Todd Bear, Elizabeth Miller, and Nancy Glynn for their patience and guidance in producing this thesis. Lastly, thank you to my friends and family that supported me through this long and circuitous journey.

1.0 INTRODUCTION

The intent of this thesis is to introduce the Pittsburgh Parks Prescription (Rx), an obesity prevention program composed of three arms; school-based, clinical-based, and community-based. It will describe the process by which the school-based arm was developed, and discuss the preliminary evaluation of the pilot implementation. Information compiled from an extensive literature review and key program informants will be used to guide proposed improvements to the current school-based model.

2.0 BACKGROUND

Over the last 30 years, obesity has more than doubled in children and quadrupled in adolescents (National Center for Health Statistics, 2012; Ogden, Carroll, Kit, & Flegal, 2014). Despite recent national declines in prevalence among school-aged children, 17% (or 12.7 million) of children and adolescents remain obese (Centers for Disease Control and Prevention, 2015c).

2.1 DEFINITION OF BODY MASS INDEX

Body Mass Index (BMI) is the most widely accepted measure for obtaining a person's level of adiposity. Despite its limitations in youth application, it remains the most recommended indication for obesity-related risks in adults, children, and adolescents. Because of the natural changes to height and weight during growth and development among children and adolescents, BMI must be interpreted relative to others of the same sex and age. BMI is calculated by dividing a person's weight in kilograms by the square of their height in meters. BMIs equal to or greater than the 95th percentile are categorized as obese. BMIs of the 85th to less than the 95th percentile are categorized as overweight (Centers for Disease Control and Prevention, 2015a).

2.2 OVERVIEW OF CHILDHOOD OBESITY

The prevalence of obesity in Pennsylvania is relatively consistent with the national average, where grades K-6 are 16.41% obese and grades 7-12 are 17.96% obese. Locally, Allegheny County falls just below the national average with K-6 at 15.29% and 7-12 at 16.98%. However, when considering the average of both overweight and obese, roughly one-third of children and adolescents meet the BMI criteria in Allegheny County (Pennsylvania Department of Health, 2015).

Obese youth are at increased risk for several immediate and long-term health effects. In the short-term, children and adolescents who are obese are more likely to have risk factors that contribute to cardiovascular disease (Freedman, Mei, Srinivasan, Berenson, & Dietz, 2007), pre-diabetes (Centers for Disease Control and Prevention, 2011; Li, Ford, Zhao, & Mokdad, 2009), sleep apnea (Dietz, 2004), and many social and psychological issues (Daniels et al., 2005). In the long-term, obese children and adolescents are more likely to become obese adults (Dietz, 2004). As adults who are obese, they are at risk for a variety of health problems such as heart disease, stroke, types 2 diabetes, cancer, and osteoarthritis (US Surgeon General & US Department of Health and Human Services, 2010).

Overweight and obesity are a result of regularly expending too few calories for the amount of calories consumed (Frayn, 2009). Keith *et al.* (2006) suggest that diet and exercise are the 'Big Two' primary players in producing the obesity epidemic. Over the years, incremental cultural changes have contributed to a world that now sensationalizes unhealthy foods and diminishes opportunities to engage in physical activity (Keith et al., 2006). The marketing industry capitalizes on the public's inability to discern between healthy and unhealthy

food choices, and technological innovation has lead to a reduction of transport, communication, and other necessitated daily physical activities.

For years, physical activity among youth has steadily been declining in the United States (United States Department of Health and Human Services, 1996). In 2014, the “Overall Physical Activity” section of the *2014 United States Report Card on Physical Activity for Children and Youth* received a “D-“ (Dentro et al., 2014). Primary indicators were taken from 2003-2004 NHANES data revealing that youth are not meeting the physical activity recommendations of sixty minutes or more of moderate-to-vigorous activity on at least five days per week. Out of children aged 6-11, 42% are meeting the recommendations, and out of youth aged 12-15, 8% are meeting them (Troiano et al., 2008).

Local data on physical activity is limited for children and adolescents. However, according to the Healthy Allegheny Teens Survey, 20% of teens ages 14-19 reported no vigorous activity for at least ten minutes at a time, and more than 50% reported less than sixty minutes of moderate to vigorous activity per day (Allegheny County Health Department, 2015). Regularly engaging in physical activity can significantly improve health in areas such as weight, muscle and bone health, mood, and life expectancy. Furthermore, habitual physical activity has the ability to reduce the risk for cardiovascular disease, type 2 diabetes, metabolic syndrome, and some types of cancers (Centers for Disease Control and Prevention, 2015b).

The Healthy Allegheny Teens Survey also identified opportunities for improvement among local youth in areas of diet and nutrition. Less than half of adolescents surveyed reported eating fruits or vegetables once per day, and 7% reported not having any (Allegheny County Health Department, 2015). Daily soda consumption was identified at 7%, half the national

average of 14%. Because of the role that diet and exercise play in obesity, interventions have historically been designed to target these two modifiable individual behaviors.

2.3 THE ROLE OF PHYSICAL ACTIVITY AND THE OUTDOORS IN OBESITY PREVENTION EFFORTS

A city's physical environment can be extremely influential to obesity prevention efforts. Both national and global research has supported the use of green spaces in urban areas to encourage kids to become more physically active (Bell, Wilson, & Liu, 2008; Dymont & Bell, 2008). The use of these types of spaces has been found to be associated with increased moderate to vigorous physical activity in kids (Bell et al., 2008). Many researchers have investigated the link between proximity to park space and the activity levels of neighborhood residents, and also have found a positive association (Potwarka, Kaczynski, & Flack, 2008).

Because of the ubiquitous and free nature of parks, they have been considered an especially important resource for promoting physical activity as a part of obesity prevention among youth (Bedimo-Rung, Mowen, & Cohen, 2005; Godbey, Caldwell, Floyd, & Payne, 2005). One study found that just the availability of open space leads to more physical activity (Ridgers, Fairclough, & Stratton, 2010). Another study demonstrated the positive impact of outdoor play facilities on the level of physical activity in children (Taylor et al., 2011).

There is a strong body of evidence that suggests that when children spend time outdoors they are more physically active (Bell et al., 2008; Cleland et al., 2008; Dymont & Bell, 2008). Research has also shown that outdoor play is associated with a lower risk of being overweight (Beyer et al., 2015; Cleland et al., 2008) and an increase in physical activity (Cleland et al.,

2008; Stone & Faulkner, 2014). One study found that among children aged 10-12 years of age, physical activity increased by 27 minutes a week for every additional hour spent outdoors (Cleland et al., 2008). In the same study, overweight prevalence dropped from 41% to 27% over three years.

In addition to weight management, youth also benefit from the improved cognitive performance associated with increased levels of physical activity (Centers for Disease Control and Prevention, 2014). During childhood and adolescence, youth develop executive function, a collection of cognitive processes involved with goal-directed cognition and behavior (Best, 2010). Cognitive function is needed when engaged in activities requiring concentration, self-discipline, or abstaining from impulse (Diamond & Lee, 2011). Diamond *et al.* (2011) suggest that aerobic exercise is one of six types of activities that robustly improve executive function in children (Diamond & Lee, 2011). Furthermore, a strong body of literature exists to support the association between childhood aerobic fitness and higher levels of cognition and improved brain structure and function (Chaddock, Pontifex, Hillman, & Kramer, 2011; Fedewa & Ahn, 2011).

Despite the numerous physical and mental health benefits connected to physical activity and the outdoors, kids are spending less and less of their time there (Cleland et al., 2010; Clements, 2004). Many factors have been attributed to the decline in outdoor exposure among youth. The rise of social media, overscheduling, fear of strangers, and modern technology have all been cited (Mainella, Agate, & Clark, 2011). Ultimately, they have all contributed to sculpting a generation that spends more time inside than outside during their out of school time.

2.4 SCHOOL-BASED OBESITY PREVENTION PROGRAMS

School environments have historically provided a popular and convenient avenue for delivering obesity prevention programming. According to a 2013 Childhood Obesity Prevention Program Meta-Analysis conducted by the Agency for Healthcare Research and Quality (AHRQ), a strong body of evidence has shown that school-based interventions are efficacious in preventing obesity (Wang et al., 2013). The writers suggest that the factors reinforcing school-focused efforts involve the standardized setting of schools, large proportion of a child's daily diet and physical activity occurring in school, and considerable amount of time children spend in school each day. According to a nationwide survey, even parents prefer schools over health care providers and the government in reducing the prevalence of childhood obesity (Evans, Finkelstein, Kamerow, & Renaud, 2005).

The AHRQ's meta-analysis categorized each school-based program into one of six study designs; School-Only-Based, School-Home-Based, School-Home-Community-Based, School-Community-Based, School-Consumer Health Informatics-Based, and School-Home-Consumer Health Informatics-Based. The analysis revealed that programs are more likely to be effective when involving both communities and families in the program design. The authors also note that obesity-prevention interventions based in schools may not be effective in reducing the environmental and social risks in areas outside of school (Wang et al., 2013).

The AHRQ's analysis repeatedly hints at the notion that a successful school-based obesity prevention program should be designed within the socio-ecological framework (Figure 1) (Bedimo-Rung et al., 2005). The conclusions mentioned above reinforce this notion by providing data to suggest that to successfully impact individual behavior, familial interpersonal relationships need to be considered and reinforcement needs to occur at the community level.

Though societal level action is not explicitly addressed in the analysis, the authors do recommend that the report findings should be utilized to help guide policy-related decisions. Thus, the socio-ecological model may be an effective framework to consider when designing effective school-based obesity prevention programming (Wang et al., 2013).

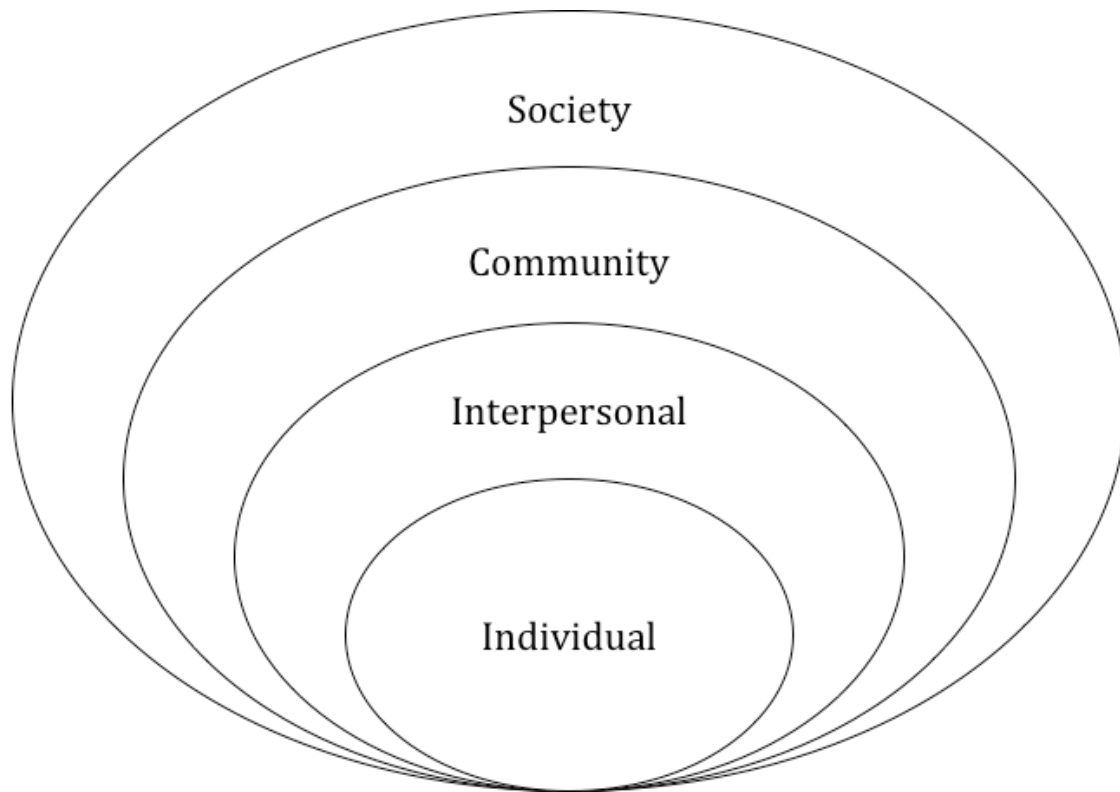


Figure 1. Socio-Ecological Model

The AHRQ identified several opportunities for future research that are in line with their findings regarding the effectiveness of using the socio-ecological framework in school-based obesity prevention programs. Wang *et al.* (2013) propose that more innovative study designs and intervention approaches need to be considered to better target the various levers for behavioral change. For example, the writers emphasize the use of social media among young people and suggest the use of consumer health informatics modalities in reaching children and adolescents. They also highlight the use of well-developed behavioral theories and recommend

their use when designing these types of interventions. Systems science is discussed as a way to guide intervention studies. The AHRQ explains the complex nature of obesity and its result of a variety of biological, social, economic, and environmental factors. They argue that to create an effective and sustainable childhood obesity prevention program, all factors and feedback loops must be targeted and addressed (Wang et al., 2013).

2.5 PARKS PRESCRIPTION PROGRAMS

Obesity is a complex issue influenced by a variety of factors, and therefore requires a creative solution. In 2010, The Golden Gate National Parks Conservancy introduced the parks prescription movement (Golden Gate National Parks Conservancy, 2010). The movement aimed to strengthen the connection between healthcare systems and the outdoors to promote outdoor physical activity and reduce health problems associated with sedentary behavior and poor diet. A year later, the National Park Service released their Strategic Action Plan, a map for adopting a holistic approach to promoting health and well-being (National Park Service Health & Wellness Executive Steering Committee, 2011). The plan outlines a strategic framework that recognizes parks and green spaces as an untapped resource. They proposed four primary focus areas to be considered in a five-year action plan: [1] Demonstration Projects– Nodes of Innovation; [2] Research and Evaluation; [3] Communications and Education, and; [4] Alignment and Synergy. In response, numerous programs have been developed nationally to promote wellness through increased park use. In October 2015, the *Environmental Health Perspectives* published an article identifying the eight unique parks prescriptions programs developed and implemented nationally (Seltenrich, 2015). An extensive literature review was conducted to examine the design,

implementation, and evaluation of each program. Characteristics of each program can be found in Appendix A.

Several of the programs assessed developed healthcare provider toolkits for implementation at an individual level within clinic-based settings. Many of the programs identified fostered environments that provided opportunities for interpersonal interaction through family-themed activities. Programs such as DC Parks Rx, Healthy Parks Healthy People, and Docs In The Park have spread to the community level by providing a platform for distributing information regarding local opportunities to engage in outdoor physical activity (American Academy of Pediatrics DC Chapter, 2016; Frederick County Parks and Recreation, 2016; Institute at the Golden Gate, 2016). All programs had clear health-related objectives, but few had been properly evaluated. None of the programs identified involved a school-based component.

One of the first parks prescription programs began just prior to the introduction made by the Golden Gate National Parks Conservancy. Only months before the publication, the Prescription Trails program was created and implemented in Albuquerque, New Mexico (Prescription Trails, 2016). The program involved numerous partners within the community and was funded by the Robert Wood Johnson Foundation. The program's primary objective was to provide all healthcare professionals tools to increase walking and wheelchair rolling on suggested routes, targeting and promoting healthy lifestyles for families. A healthcare provider toolkit was created and continues to be publicly available on their website (Prescription Trails, 2016).

Baltimore's Docs in the Park program has a slightly more rigorous clinical component. Like the Prescription Trails program, a provider toolkit was created, but the program offers a

much more comprehensive set of resources that can be utilized by both providers and the public (Frederick County Parks and Recreation, 2016). In 2013, a needs assessment was conducted and specific actions have been taken within Docs in the Park to address their recommendation for increased children and family programming. East Bay Regional Park District's Stay Healthy In Nature Every day (SHINE) program in Oakland, CA has a similar format but also provides training to its clinic volunteers to accompany print resources (East Bay Regional Park District, 2016).

Both the DC Parks Rx (American Academy of Pediatrics DC Chapter, 2016) and Greater Williamsburg Area Park Prescriptions (Greater Williamsburg Area Park Prescriptions, 2016) programs follow a similar format to Docs in the Park. In addition to this, DC Parks Rx maintains a database that warehouses numerous one-page printouts specific to each park. Each printout includes information regarding transportation and opportunities for physical activity at each park. Pages are accessed through the database located on the program's public website. Zip codes can be entered to retrieve the park pages for the nearest parks. An evaluation of the program revealed that after DC Parks Rx was implemented, there were increases in the number of children who visit a public park, the number of parents who believe that physical activity affects the health of their child, and the number of parents who reported their provider discussed the importance of physical activity and recommended their child spend time at parks (Zarr, 2014).

Further developing the community health aspect of parks prescription programs, The Institute at the Golden Gate initiated their Healthy Parks Healthy People: Bay Area program in 2012 (Institute at the Golden Gate, 2016). Like New Mexico's Prescription Trails program, Healthy Parks Healthy People: Bay Area involved many local partners. Through these partnerships, the Institute was able to secure funding for the program. Similar to Prescription

Trails, Healthy Parks Healthy People involved individual-level provider prescriptions, but also extended into the community level through a public education component. The program involved regularly coordinated efforts to improve the community atmosphere by increasing the number of opportunities to engage in outdoor physical activity. The cornerstone of the program is a regularly maintained calendar on the program's public website and provides information for numerous activities occurring each month. Activities range from moderate-level family fitness nights and nature walks to more rigorous events such as races, karate, and boot camps. Healthy Parks Healthy People established a framework through its development that can be adopted in neighboring cities within California. The framework has also been implemented in San Francisco and is managed by San Francisco Recreation and Parks (San Francisco Recreation and Parks, 2016).

The most comprehensive parks prescription program appears to be LiveWell Greenville's Park Hop program (Besenyi et al., 2015). The program created an incentivized passport style design that encouraged kids to embark on a summer-long scavenger hunt. All program funding was provided by parks and recreation agencies, local businesses, and non-profit organizations. Committees were formed to help inform and guide decisions, as well as facilitate improvements made to community health indirectly related to the Park Hop program. An informal evaluation indicated the program's positive influence on park awareness and visitation through an increase in new park exposure and weekly park visitation.

2.6 PITTSBURGH PARKS PRESCRIPTION

In early 2015, The Pittsburgh Parks Conservancy decided to follow the national parks prescription trend and develop the Pittsburgh Parks Rx program for their local community. A small group from the conservancy formed to determine important steps in project. Partnerships were created within the community, and stakeholders were brought on board to offer input and guidance along the way. Funding was awarded to support the development and execution of the Pittsburgh Parks Rx program through the Pitt Innovation Challenge (PInCh) competition at the University of Pittsburgh. I was recruited to assist with the program coordination, implementation, and preliminary evaluation. Because of previously established partnerships and willingness to engage, the two schools identified for pilot delivery were Arsenal Elementary and Arsenal Middle School. After discussion with each school's respective principals, it was decided that the Pittsburgh Parks Rx program would be tested in both third and sixth grade gym classes. Gym teachers from both schools agreed to implement the Pittsburgh Parks Rx in their classes during the fall and winter of 2015. Below, Figure 2 illustrates the program's timeline and the activities that precede and will follow the current "revise program format" phase.

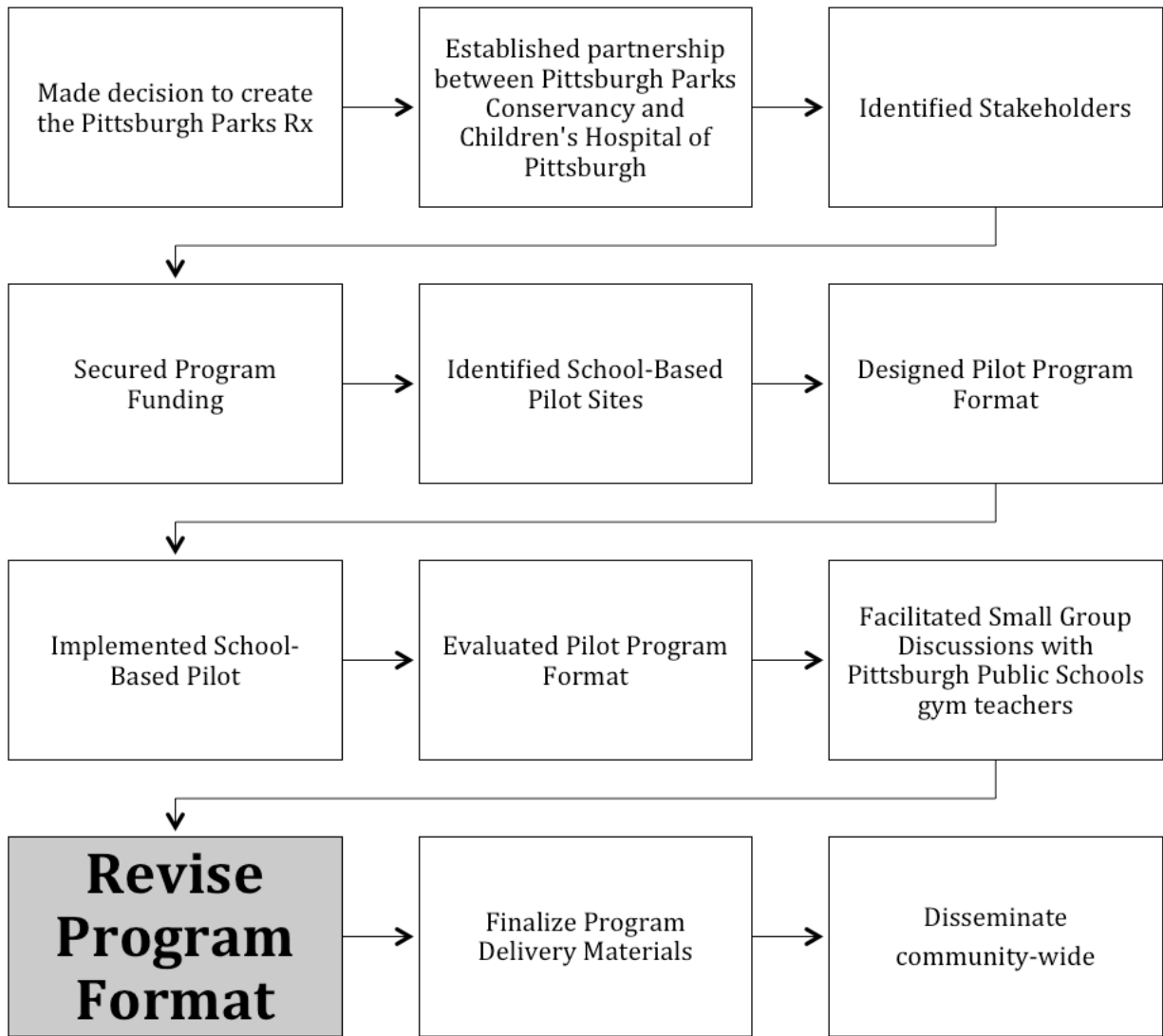


Figure 2. Pittsburgh Parks Rx Program Development Timeline

Similar to many of the earlier parks prescriptions programs and consistent with the socio-ecological framework, the Pittsburgh Parks Rx aims to address behavioral change at an individual and community level. The program approach includes three components: the clinic and community-based settings seen in previous parks prescription programs, and also introduces a school-based setting for delivery. This thesis will primarily focus on the school-based program format and delivery.

The Pittsburgh Parks Rx has three defined objectives: [1] increase program recipient knowledge regarding local parks, [2] increase the program recipient desire to utilize park systems, and [3] increase program recipient self-reported physical activity. All objectives are outlined in the logic model below in Figure 3.

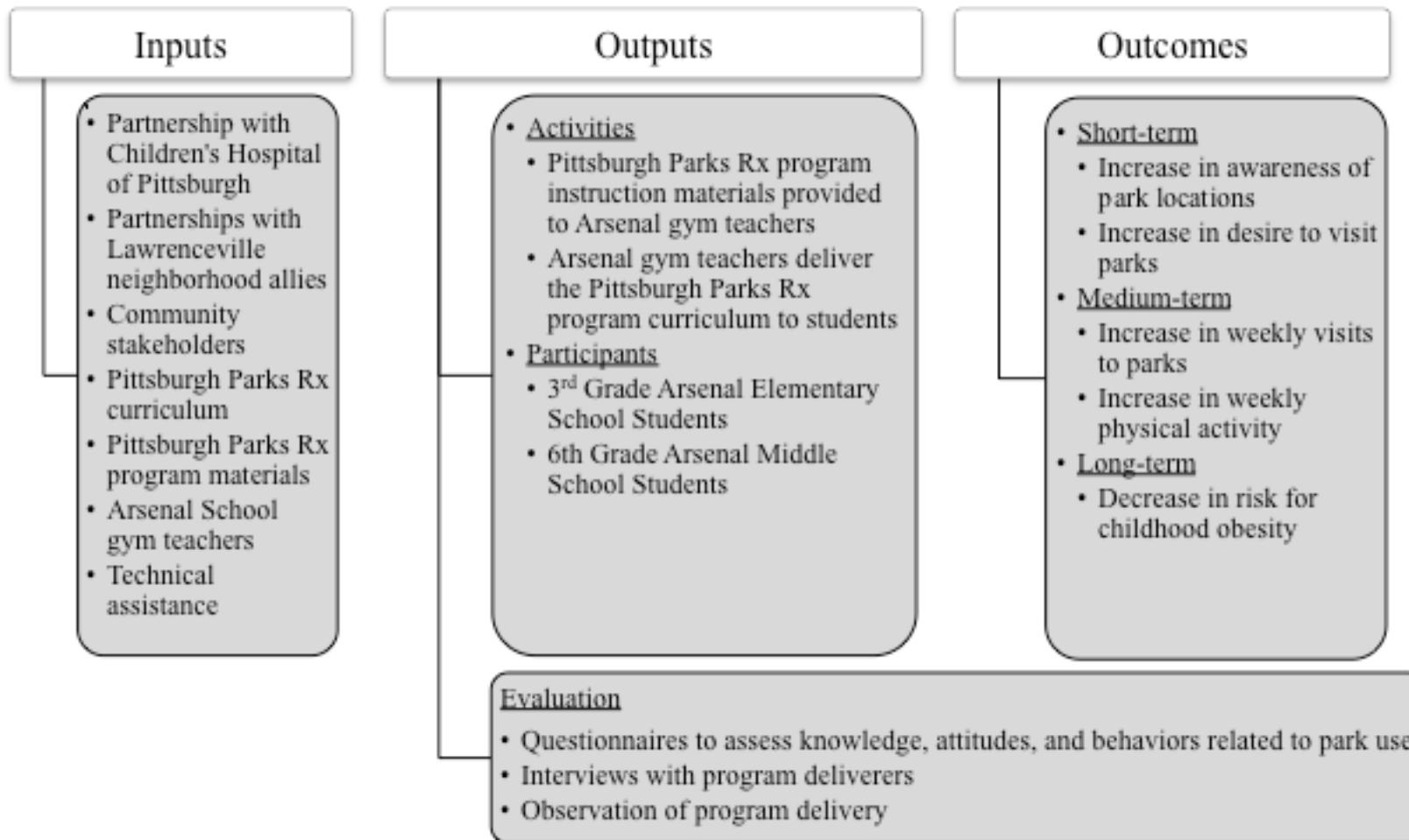


Figure 3. Pittsburgh Parks Rx Program Logic Model

To achieve the Pittsburgh Parks Rx objectives, the program assumes exposure to parks and related resources will lead to increased knowledge, improved attitudes, and increased park use among program participants, ultimately leading to increased physical activity and decreased risk for childhood obesity (Figure 4). Several constructs of Social Cognitive Theory support this assumption (Bandura, 1986). Because of the dynamic interaction between a person and their environment, the Pittsburgh Parks Rx leverages reciprocal determinism to influence student behaviors by creating a school environment that promotes park use and physical activity. The program also focuses on improving self-efficacy relating to park-use through student engagement in park-based physical activities.

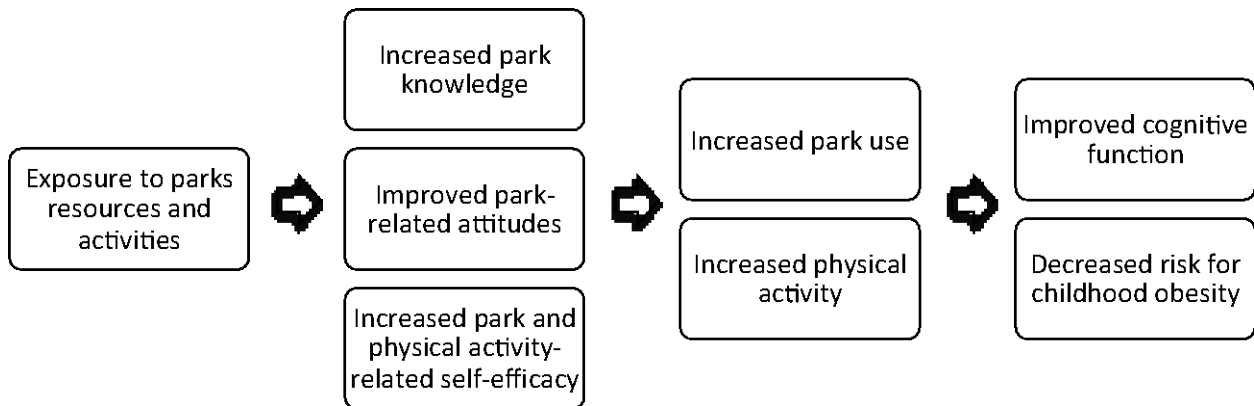


Figure 4. Pittsburgh Parks Rx Program Theoretical Model

3.0 METHODS

I collaborated with the Pittsburgh Parks Conservancy and Children’s Hospital of Pittsburgh to perform several activities that contributed to the design and pilot implementation of the Pittsburgh Parks Rx program. We established various partnerships to ensure proper expertise and guidance was utilized in the early decision making process. We also engaged key stakeholders to elicit feedback on initial delivery format and program material design. The methods used and data compiled will be discussed and reflected upon in the following subsections.

3.1 DEVELOPING PARTNERSHIPS

During the infancy of the Pittsburgh Parks Rx, the development of partnerships happened organically. The genesis of the program emerged from a series of conversations and brainstorming initiated by the Pittsburgh Parks Conservancy with a broad group of stakeholders that had a compatible mission or focus. The initial strategy was opportunistic in nature, allowing participation in local committees and professional connections to navigate the process of identifying potential program partners. Because of this, conversations began with then Program Director for Phipps Conservatory’s Let’s Move program, Hannah Hardy as well as the Program Manager in the Children’s Hospital of Pittsburgh’s Weight Management Center, Anne Marie

Kuchera. As the program momentum increased, a greater emphasis was placed on strategizing the development of key partnerships.

Due to the nature of parks prescription programs synergizing parks with health, many of the first programs involved partnerships between healthcare providers and recreational organizations. Recognizing the importance of this, the Pittsburgh Parks Conservancy formed a collaborative partnership with the Children's Hospital of Pittsburgh. Because of this partnership, Anne Marie Kuchera was able to provide a broader vision for the program by contributing her community benefit expertise to shape the outlook of the Pittsburgh Parks Rx.

Though the Pittsburgh Parks Rx program was not initially focused on any specific neighborhood, discussions with early partners revealed that it was more feasible to limit the pilot design and implementation to one geographic area. In doing this, more resources could be dedicated to establishing more specific partnerships in the local community. Lawrenceville was identified as the first neighborhood to receive the Pittsburgh Parks Rx because of its depth of community resources in such a small geographic location. Exercising the Pittsburgh Parks Conservancy and Children's Hospital of Pittsburgh's extensive network of professional relationships, several partnerships were established in Lawrenceville including Arsenal Elementary School, Arsenal Middle School, and local non-profit advocacy organization, Lawrenceville United.

Later, funding for the Pittsburgh Parks Rx program was secured through the Pittsburgh Parks Conservancy, creating a careful balance of power with the primary program partner, Children's Hospital of Pittsburgh. Caution was exercised frequently among the partnership members when discussing potential directions for the program to take. While the Pittsburgh Parks Conservancy ultimately held the decision-making authority, Children's Hospital of

Pittsburgh offered important guidance regarding the public health perspective and the program’s intended health outcomes. The Pittsburgh Parks Conservancy personnel illustrated an example of this balance by leading a community meeting on Children’s Hospital of Pittsburgh property.

3.2 ENGAGING STAKEHOLDERS

The next step involved forming a group of stakeholders that could provide guidance and feedback at multiple points throughout the planning and execution phase of the Pittsburgh Parks Rx. Pittsburgh Parks Conservancy and Children’s Hospital of Pittsburgh identified group members through networking opportunities and by approaching community members where a relationship had already been established. The group of stakeholders contributed diverse backgrounds and expertise, and was composed of a variety of different positions. Each stakeholder has been listed in below in Table 1 and assigned categories based on their respective intensity and level of engagement in various stages of the program development and implementation (Butterfoss, 2007).

Table 1. Pittsburgh Parks Rx Stakeholders

Stakeholders	Type of Relationship
Middle School Principal	Networking, coordinating
Middle School Gym Teacher	Cooperating
Elementary School Principal	Networking, coordinating
Elementary School Gym Teacher	Networking, cooperating
Middle School/Elementary School Nurse	Networking, cooperating, collaborating
Parents	Networking
Physician at Family Care Practice	Networking, cooperating
Family Care Connections Resident Health Coach Specialist	Cooperating, collaborating

Table 1 continued

Public Health Graduate Student	Coordinating, collaborating
Director of the Healthy Schools Program at the Children’s Hospital of Pittsburgh	Networking, collaborating
Program Director at the Allegheny County Health Department	Networking
Neighborhood-specific community organization personnel	Networking

Regular meetings were scheduled with the program team and stakeholders to elicit feedback regarding the design of print materials and preliminary program format. Attendees were encouraged to provide their insight on potential directions for the program to take considering their unique and diverse backgrounds and experience within the local community.

A second critical partnership was established to connect the Pittsburgh Parks Rx to the Pittsburgh Public School District. Leveraging on the relationships built both before and during the stakeholder meeting, top-level school personnel from Arsenal Middle and Elementary Schools agreed to be a part of the pilot implementation of the Pittsburgh Parks Rx program. This was a very important relationship to secure, as it was crucial to obtaining buy-in from the intended program deliverers, the health and physical education teachers. Furthermore, the relationship provided an avenue for evaluating and testing questionnaires on the age groups that would ultimately complete the questionnaires.

3.3 DELIVERY FORMAT

The program curriculum included a collection of print materials to assist in the delivery and execution of the Pittsburgh Parks Rx. I provided print materials to the program deliverer several days prior to implementation and included the following:

- Pittsburgh Parks Rx Prescriber Letter (Appendix B)
- Pittsburgh Parks Rx Prescriber Guide (Appendix C)
- Pittsburgh Parks Rx Baseline Participant Survey (Appendix D)
- Pittsburgh Parks Rx Participant Folder and Contents (Appendix E-H)

The pilot sites, Arsenal Elementary School and Arsenal Middle School, are both located in front of Arsenal Park in Lawrenceville. Because of the school’s proximity to the city park, teachers frequently take advantage of it during the school year. This convenience served as an ideal delivery location for the Pittsburgh Parks Rx. Gym teachers from the Elementary and Middle Schools agreed to implement the program in their third and sixth grade classes in the fall or winter of 2015. Figure 5 illustrates the distribution map and delivery format for each of the two school-based pilot sites.

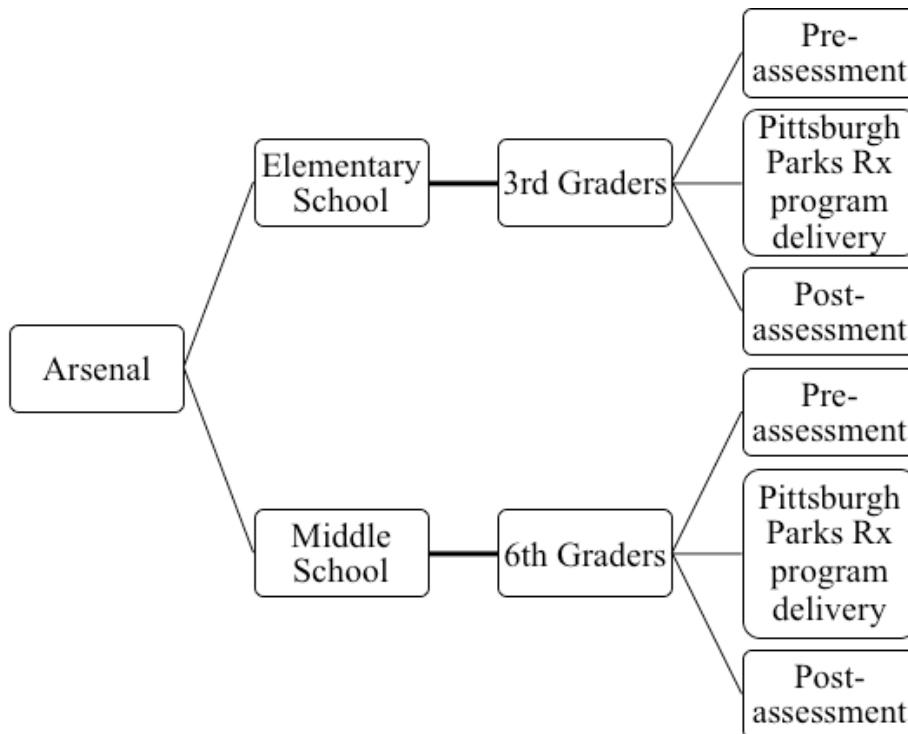


Figure 5. Pittsburgh Parks Rx Program Delivery Format

Gym teachers administered a questionnaire for each group of students at the beginning of a class period to gather baseline information regarding the knowledge, attitudes, and behaviors related to park use. During the following scheduled class, gym teachers facilitated the Pittsburgh Parks Rx program curriculum. Students will be administered a post-assessment six months after the original program delivery.

We utilized stakeholder group meetings to obtain feedback on the delivery format. Although several suggestions were made to incorporate things like social media and other technology-based approaches, due to limited time and resources, few of them could be integrated.

3.4 PRESCRIBER'S GUIDE

The prescriber's guide contained a breakdown of instructions on delivering the Pittsburgh Parks Rx program in the structured setting of a health and physical education class. It included a script that suggested general language that could be used to convey the purpose of the program as well as the value in the print materials that were provided to the students. The guide provided a timeline for the program activities to take place as well as suggested durations for each activity. The design was developed through the collaborative efforts of myself, and personnel from the primary Pittsburgh Parks Rx partnership between the Pittsburgh Parks Conservancy and Children's Hospital of Pittsburgh. The Prescriber's Guide was provided to the program deliverer five days prior to the program implementation. Program deliverers were instructed to administer the baseline questionnaire in a class prior to the delivery of the Pittsburgh Parks Rx, and use the subsequent class to deliver the Pittsburgh Parks Rx. See Appendix C for visual representation.

3.5 PITTSBURGH PARKS RX FOLDER

The Pittsburgh Parks Rx folder design was created by Gavin White, Community Outreach Coordinator at the Pittsburgh Parks Conservancy. Gavin has an affinity for graphic design and aimed to develop a collection of print materials that was representative of the vision that the Pittsburgh Parks Conservancy had for the Pittsburgh Parks Rx program. Though the pilot implementation targeted only third and sixth grade children, all program print materials were designed for an audience inclusive of children ranging from kindergarten to twelfth grade. Once a mock-up was created, it was presented at the first stakeholder meeting to elicit feedback.

The folder shell is a trifold folder with three inside pockets (Appendix E-F). On the left inside pocket, there is a list of all the parks in the Pittsburgh area with a question asking the reader which parks they have been to. In the center pocket, there is a general scavenger hunt with images and names for various creatures and items typically found in a park. On the right inside pocket, there is a colorful list of activities that could be done in a park during any of the four seasons. Some of the activities included: act like an animal, build a stick fort or fairy house, and map and exercise course. Several leaflets were also included in the folder. Each leaflet had a different physical activity or park-related learning tool. Some of the items include: park-specific scavenger hunts, season-specific activity list, and an informational flier describing ways to make it easier to get your family outside.

The park-specific leaflets are designed to follow a standard format, each with specific information and activities tailored to the specific park (Appendix G-H). On one side of the leaflets, the title of the park is illustrated with an iconic photo of the park. It also lists the address, hours, and various directions to the park using different modes of transportation. The directions are accompanied by a small image of the park centered on a city map. A brief history

of the park is described as well as indications of available facilities and other resources related to the park. On the other side of the leaflet, a list of activities are listed that can be played while at that specific park, such as counting the stairs, racing through the bases on a baseball field, and collecting leaves. At the bottom of the sheet are eight photos of various items or locations that are specific to that park, each with a small box to check off items as they are found.

4.0 RESULTS

4.1 PROGRAM IMPLEMENTATION

I collected observational data at each of the Pittsburgh Parks Rx pilot implementation sites; Arsenal Elementary School and Arsenal Middle School.

4.1.1 Arsenal Elementary School

The Pittsburgh Parks Rx program was delivered to a class of third graders at Arsenal Elementary School at 11:15am on November 30, 2015. The Arsenal Elementary School Gym Teacher assumed the role as the “prescriber”. Because the Elementary School students do not have designated gym clothes to change into, the transition from their previous class into the park behind the school was relatively quick and left more time for the program delivery. The gym teacher conducted the program introduction (Appendix B) inside of the gym prior to leaving for Arsenal Park. He felt it was an appropriate venue as it minimized distractions and allowed for a constructive discussion.

Next, students exited the elementary school in single file, each carrying their Pittsburgh Parks Rx folder. The group of third graders was very diverse as it included several international students and minorities. The students appeared to be very excited about going outside, and

grateful to have received their very own Pittsburgh Parks Rx folder. They were quoted saying, “*wow, I get to keep this folder*”, and “*it’s really mine to take home?*”

Once the class arrived at Arsenal Park, the gym teacher explained the rules of the scavenger hunt. He then advised the class to find a partner for the game. It was assumed that as the class had not yet reached the age where they are more self-conscious and selective of a partner, they quickly paired off. Once pairs had been established, the gym teacher released them into the park to begin the scavenger hunt. The group remained with their partners, occasionally seeking guidance from other pairs. Most students ran, and some walked quickly. Though The gym teacher hadn’t alluded to the game being a competition, the students searched quickly for the photos listed in the Arsenal Scavenger Hunt printout.

The entire scavenger hunt took around 20 minutes to complete, and all students finished within 5 minutes of each other. Several students mentioned things like “*this was fun, let’s do it again*” and “*can we just stay in the park for recess too.*” At the conclusion, the gym teacher advised them to play on the playground until the end of the class. All students remained lively while playing on the park equipment.

4.1.2 Arsenal Middle School

The Pittsburgh Parks Rx program was delivered to a class of sixth graders at Arsenal Middle School at 11:00 am on December 3, 2015. The Arsenal Middle School Gym Teacher assumed the role as the “prescriber”. Due to nature of middle school students changing into separate clothes for gym class, the transition from their previous period to gym class took an additional twenty minutes. The weather had been deemed too cold for students to go outside without jackets, and the logistics for obtaining their jackets was estimated to be an additional 10-15

minutes. In lieu of going outdoors, the gym teacher held gym class in the school's gymnasium. The students were filed into the bleachers and were seated patiently when I arrived for observation. The gym teacher had administered the baseline questionnaires during the class prior. He announced to the students that Gavin White and myself were going to discuss the parks with them. They had been provided the Pittsburgh Parks Rx folders prior to our arrival. Gavin and I facilitated the Pittsburgh Parks Rx introduction as described on the Prescriber's Guide (Appendix B) by engaging the students in discussion. The students' level of engagement was low to moderate, as most students remained quiet while only a few interacted when addressed directly. Several males disclosed their enjoyment in playing sports with peers, but did not favor parks as a destination for outdoor play. Several of the female students mentioned that they enjoy dancing, and agreed that they would do it in a park. After 5-10 minutes of discussion, the students were told by the gym teacher to perform basketball drills for the remainder of the class period. Immediately following the announcement, the students' level of enthusiasm appeared to increase significantly.

4.2 PROCESS EVALUATION

The level of cooperation from the Arsenal Elementary School Pittsburgh Parks Rx "Prescriber", was relatively high. Engagement with the gym teacher began through an email connection made by a member of the partnering organization, Lawrenceville United. Several emails were exchanged regarding the scheduling of times for questionnaire, folder, and instruction drop-offs, as well as program delivery. The gym teacher was fairly responsive by email and readily available for brief phone calls, providing an active outlet for regular communication. He

administered the questionnaires prior to the scheduled delivery for the Pittsburgh Park Rx, and returned them within one week of completion. The original scheduled delivery date was rescheduled once due to inclement weather as Arsenal Park was too wet for outdoor play.

The Arsenal Elementary School gym teacher was later interviewed regarding his experience delivering the Pittsburgh Parks Rx and his feedback regarding program adaptations for older students. He emphasized the involvement of youth stakeholders in the design process. He noted that, “*the ones [Pittsburgh Parks Rx programming] for middle school of high school, the kids have to be a part of the process [program design].*” He also stressed the importance of a design that allowed for interactive participant involvement in saying; “*they [the older kids] want activities where they can just go. They want to go and play. They want less directions... they want it to be their idea... they feel empowered when they can give suggestions.*”

Time expenditure was a common theme in the interview as well. The gym teacher disclosed that a lot of kids would say “*I only get gym so often, so when I’m there I want to play.*” He explained “*the kids don’t want to lose that time, since they don’t have much of it... or [don’t want to] listen to someone talk.*”

The Arsenal Elementary School gym teacher echoed the safety concerns discussed in the small discussion groups. He said, “*Some of the neighborhoods are just so unsafe... here [Arsenal Middle/Elementary] it’s easy because it’s [Arsenal Park] right here... some of them, you never know what’s going on, someone might be driving by looking for a kid.*” He explained that the students are aware of the danger and said, “*The kids say, [the basketball courts] there are fights every night.*”

4.3 OUTCOME EVALUATION

To gather baseline information on short-term and mid-term outcomes related to knowledge, attitudes, and behaviors regarding park use among children at Arsenal Elementary and Middle School, a four-question questionnaire was developed for administration by both Arsenal Elementary and Arsenal Middle School gym teachers (Appendix C). Dr. Sandra Sauereisen, Medical Director of UPMC St. Margaret Family Medicine Residency participated in the review and revision of the questionnaire. The questionnaire was then reviewed by third and sixth grade teachers at Arsenal Elementary and Middle Schools, and tested in their classrooms to ensure the reading level was appropriate for the intended age groups.

When developing the questionnaire, it was assumed that all participating Arsenal students lived near Arsenal Park. Therefore, in assessing knowledge regarding parks, the question was asked, “Do you live near a park you can play in?” After observing the Arsenal Elementary School delivery, it was discovered that the assumption was incorrect and students commuted from outside the immediate proximal area. When administering the follow-up questionnaire, a question will be added to resolve this. Additional barriers were encountered when assessing the measures used in the questionnaires, necessitating the recoding of several answer choices.

To gather further insight on behavioral patterns among those surveyed, the question was asked, “What do you do at a park?” The answers provided were: “skate/skateboard”, “ride bikes”, “swim”, “playground”, “climb trees”, “sports”, “walk/run”, and “other” as an open ended question. Follow-up questionnaires will be scheduled sometime in the spring, roughly 6 months after the baseline questionnaires were administered.

Among 25 surveyed third graders, 88% reported enjoying going to the park. Sixth graders were fairly consistent at 82% of 17 students surveyed. When asked how often they go to

the park, 92% of third graders and 88% of sixth graders reported sometimes going to the park each week. Although local data are limited regarding frequency of park visits among adolescents, it was found that only 47% of teens in Allegheny County report at least sixty minutes of moderate to vigorous activity per day (Allegheny County Health Department, 2015). Though no sound conclusions can be drawn from local data regarding the relationship between age, park use, and level of physical activity, it can be hypothesized that children grow up to become adolescents who are less likely to go to the park, and therefore are less physically active. Research exists to support the notion that as children enter adolescence, they are less physically active (Kimm et al., 2000). Additionally, the RAND Corporation presented preliminary data from a National Study of Neighborhood Parks in 2016 that indicated less adolescents are utilizing park systems when compared with children (Cohen & Han, 2016).

As the Pittsburgh Parks Rx is being adapted for adolescent participants, questionnaires should be developed that include questions regarding age and physical activity frequency. Outcome data can then be utilized to compare more effectively to the available county data.

4.4 ELICITING EXPERT FEEDBACK

After both pilot programs had been implemented, eighty male and female health and physical education teachers in the Pittsburgh Public School District were required to attend a school “in-service” day. Because of the partnership between this entity, the Pittsburgh Parks Conservancy, and the Children’s Hospital of Pittsburgh, an opportunity existed to present the Pittsburgh Parks Rx. To better understand the unique experiences of each teacher in their school environment, I

facilitated several small group discussions to elicit feedback on the Pittsburgh Parks Rx as well as possible adaptations and limitations they saw as relevant.

I provided participants with a brief introduction of the Pittsburgh Parks Rx, the history of Parks Rx programs, and the format of the recent pilot implementation at Arsenal Elementary and Middle School. I asked them to provide their expert feedback in four areas: the Pittsburgh Park Rx folder (Appendix E-F), the Pittsburgh Parks Rx delivery format (Appendix B-C), adaptations to the program, and limitations within their respective schools. I divided the group into four groups, each with a specific focus area. At each “station,” groups were provided with several questions to consider when providing their feedback.

4.4.1 Pittsburgh Park Rx Print Materials

To facilitate discussion in the Pittsburgh Parks Rx print materials group, the following questions were asked:

1. Do you think this is appropriate for middle school students?
2. Do you think this is appropriate for high school students?
3. What are your thoughts regarding the design?
4. What are your thoughts regarding the chosen activities?
5. How could it be improved?

Most participants felt the print material format was adequate for middle school students, but several expressed concerns that it was better suited for Kindergarten through fourth grade. All participants agreed that the format was not appropriate for high school students. To address the issue, comments were made regarding both the visual design of the print materials as well as the content. Most participants felt that the packet appeared to be user-friendly and educational,

but several felt that improvements could be made to attract an older audience. One person called attention to the photo choice on the front cover of the folder and said, “*The picture in the front needs to change for high school.*” They explained that the children in the images need to look similar to their target population to increase the likelihood of recipient buy-in.

Several suggestions were made regarding improvements to the print material content. One person suggested making an addition to make it more suitable for adolescents, “*maybe link to community sports teams for the high school kids.*” Several of the participants echoed this opinion and said, “*Incorporate club activities for the older kids.*” Many suggestions were made that involved incorporating a calendar with information and resources related to sports and other age-appropriate activities available locally. The group concluded that for the older students, the print material should resemble more of an informational packet of available resources and opportunities rather than a collection of games.

The group also identified a need for a second folder to be adapted for parents. Several people mentioned that the information that older students may not value such as park locations and travel options would be better suited for their parents.

4.4.2 Pittsburgh Park Rx Delivery Format

To facilitate discussion in the Pittsburgh Parks Rx delivery format group, the following questions were asked:

1. Do you think this is appropriate for middle school students?
2. Do you think this is appropriate for high school students?
3. What is the appropriate number of exposures (e.g. once/year, twice/year, etc.)
4. What are some ideas for activities during multiple exposures throughout the year?

5. Do you have any other recommendations to the delivery format?

Similar to the feedback received on the print materials, most participants agreed that the delivery format was appropriate for middle school students but felt it should be modified for the older students. Some of the suggestions made regarding additional activities to include were geocaching, fishing, rock climbing, biking, Frisbee golf, ice-skating, fitness stations, using local, and circuits. Everyone agreed that the program should be delivered at multiple times throughout the year based on season. One person provided season-specific activities by suggesting, *“collect leaves in the fall, plant flowers in the spring, and go sledding in the winter.”*

Several participants suggested the program incorporate opportunities for using technology. Some mentioned the use of step-tracking devices and other physical activity tracking applications. Others suggested incorporating the use of social media and other popular social networking platforms.

Another common discussion theme involved the use of existing infrastructure or personnel to improve the program. To address comments regarding park safety, one person suggested to *“ask the local police to join the class to get to know the kids. It’s safer that way too.”* Another person reinforced an idea mentioned during the previous discussion group by suggesting that local recreational facilities should be taken advantage of. They explained that joint-use agreements are common in urban school systems and many resources are not being taken advantage of. Someone also mentioned taking advantage of end-of-the-year picnics as an additional Pittsburgh Parks Rx exposure opportunity.

Many of the participants expressed concerns regarding the lack of time and flexibility in their gym classes. To address these concerns, many suggested that the program format be more informal and flexible to accommodate their ever-changing class atmospheres. They

recommended shortening the discussion to allow more time for physical activity. Participants also mentioned that activities should be provided for both indoor and outdoor program deliveries.

Lastly, a theme regarding universal training emerged in the discussion group. Several of the participants expressed an interest in receiving training on how to deliver the Pittsburgh Parks Prescription in their class. Some people suggested that it would be helpful to have someone model the program for them prior to delivering it themselves.

4.4.3 Pittsburgh Park Rx Delivery Limitations

To facilitate discussion in the Pittsburgh Parks Rx limitations group, the following questions were asked:

1. Is there anything that can or can't be done in gym class?
2. Is there anything that we should be particularly mindful of?
3. Are there any other limitations that should be considered?

During facilitation of this discussion, several concerns and patterns emerged that had not been considered when designing the initial program delivery format. The most striking concern expressed was the potential for violence prohibiting outside recreation. One participant explained that his students are “*not allowed to go outside the building*” due to safety concerns such as guns, glass, needles knives, drugs, etc. Many echoed this response by saying, “*the space we are using may not always be clean or safe,*” and “*parks may not be clean or maintained.*” Someone also mentioned that additional supervision might be required for some classes to go outside. They said, “*The safety is a big issue at the parks, especially if the kids are not old enough to go freely on their own.*” Others have simply stated that, “*parks have lost their charm.*”

Another common theme in the discussion involved time limitations. One person explained, “*We already have numerous programs in our classes.*” Another person said, “*Kids only have gym class 25% of the school year, so when they are here [gym class], they want their gym time.*” Time limitations were attributed to several factors including curriculum design, administrative red tape, class size, and transportation to and from class.

Individual-level concerns were also mentioned when discussing possible limitations to delivering the program in gym classes. Some teachers mentioned that, “*many students are not dressed appropriately for the cold. They only wear hoodies.*” Others explained that allergies, injuries, and parent permission also impact the class activities.

4.4.4 Pittsburgh Park Rx Adaptations

To facilitate discussion in the Pittsburgh Parks Rx adaptations group, the following questions were asked:

1. What are some alternative activities for when the weather does not allow for the program to take place outside?
2. What are some adaptations for students with disabilities?
3. What are some adaptations for students with injuries?
4. Are there any other adaptations that should be considered?

A theme that emerged during the facilitation of the adaptations discussion group was the use of diverse equipment and activities. Teachers noted that things should be made handicap accessible, or special assignments (such as score keeper, recorder, etc.) should be made. Several people reinforced the previously mentioned use of recreation facilities during inclement weather. Others recommended using kayaks in the pool or indoor active recess kits. Another person

echoed a comment from the delivery format group and suggested that partnerships should be established with local police and park rangers.

5.0 DISCUSSION

The design and implementation of the Pittsburgh Parks Rx deviated in several ways from the ideal delivery. Because of this, several challenges will be identified and modifications to the program will be proposed.

5.1 CHALLENGES

Several challenges were encountered in the design, implementation, and evaluation of the Pittsburgh Parks Rx program. Program funding was secured through the Pittsburgh Parks Conservancy, causing a slightly imbalanced power dynamic. Though the partnership between the Pittsburgh Parks Conservancy and Children's Hospital of Pittsburgh allowed for collaboration at all levels, decision making authority was ultimately held at the conservancy. Because of this, there were several minor conflicts in the agenda setting between each organization. The most impactful example of this occurred when discussing the timeline during the program's early stages of development. Program funding was awarded in July 2015, and was utilized to print the materials for the Pittsburgh Parks Rx folders. Once the folder design had been finalized, the printing process was expected to take two to three weeks to complete. The Pittsburgh Parks Conservancy set a goal to deliver the first Pittsburgh Parks Rx in Arsenal Middle and Elementary School in the fall of 2016. Because of this goal, some steps in the

timeline were less emphasized. Little time was left to capitalize on stakeholder feedback and its integration into the program format. The number of exposures within each of the schools was also negatively affected. While key program informants advised that there should be multiple exposures throughout the school year, the timeline allowed for only one exposure due to the brief window of opportunity between finalizing the program and implementing prior to the colder winter months.

Another challenge was incurred while working within the assumed context set by either the Pittsburgh Parks Conservancy or the Children's Hospital of Pittsburgh. Because of each organization's unique purpose and role in developing the Pittsburgh Parks Rx, the assumed context in which the program planning activities took place occasionally differed. The Pittsburgh Parks Conservancy occasionally placed a heavy emphasis on incorporating more promotional items to highlight parks and other nature-specific activities, while the Children's Hospital of Pittsburgh placed more emphasis on reinforcing the health benefits of parks and taking on a more general public health approach to selecting items and activities for the program.

Despite securing a small amount of funding, financial challenges existed in both the design and implementation of the Pittsburgh Parks Rx. Program funding covered only the print materials, while all other expenses were incurred by either the Pittsburgh Parks Conservancy, Children's Hospital of Pittsburgh, or in-kind. Full-time personnel could not be assigned to the project, and schools were not financially incentivized. Additionally, while the cost of print materials was reimbursed, the design and marketing was done in-kind.

5.2 LESSONS LEARNED

It is imperative that stakeholders are involved in the program planning process from the beginning. The procurement of program funding has the propensity to dictate the speed in which development and implementation take place. Because of this, key program informants need to be identified and engaged prior to any other activity taking place and potentially reprioritizing the order of program activities.

When designing programs aimed at engaging adolescents, it is very important to involve them in the development process. Program planning guided by age groups that do not reflect the target population have the potential to result in a program design that does not result in adequate buy in. Buy involving end users from the beginning, the program will be better advised and is more likely to be appropriate and relevant to the intended age group.

For any effective behavioral intervention to take place, exposures need to occur at many levels and at many times. An effective parks prescription program will embody this by incorporating opportunities for various exposures to occur at levels ranging from individual to societal policy.

Pilot testing of program evaluation instruments should be done extensively. Imperfect instrument design poses a risk for faulty data output. Instruments should be assessed by relevant professionals and tested multiple times by the intended target population.

Program implementation can be seasonally impacted and result in a reduced number of exposures due to outdoor-related restrictions set forth by school policy. As experienced with both pilot schools, if outdoor temperatures fell below freezing, students were not permitted to spend time outside. Furthermore, if the outdoor environment had been negatively affected by recent weather, students were not permitted to play there.

The Arsenal Elementary School gym teacher mentioned during program delivery that uptake and adherence could shift based on the season. He explained that in the weeks prior to the school's annual winter break, students become increasingly more absent and less participatory in class. He also noted that this trend exists at the end of the school year. The gym teacher advised that when working to improve the program, special attention be placed on the time of year each exposure to the Pittsburgh Parks Rx takes place.

5.3 PROPOSED MODIFICATIONS

5.3.1 Pittsburgh Parks Rx within the Socio-Ecological Framework

The current program format was designed prior to eliciting expert feedback and extensively reviewing the literature on other parks prescription programs, and therefore lacks a strong evidence base. The following proposed modifications seek to resolve this.

The Pittsburgh Parks Rx as it exists currently is a single-level approach to a parks-focused obesity prevention program. During the discussion group facilitation, a pattern emerged within the limitations discussion group. Several participants expressed a concern for the safety in the areas surrounding their school as well as the neighborhoods students lived in. At least one gym teacher explained that it was against school policy to allow students to go outside during the school day. The individual noted that this policy had been implemented to address the violence and high-risk activities taking place near the school. Because the Pittsburgh Parks Rx's current design only provides an avenue for individual-level delivery, there is room for improvement when considering modifications aimed at creating a program that can be delivered universally.

To ensure that all limitations and adaptations identified in the discussion groups are being considered, the design of the Pittsburgh Parks Rx program should be within the context of the socio-ecological model. Figure 6 illustrates the various factors that can be addressed within the framework.

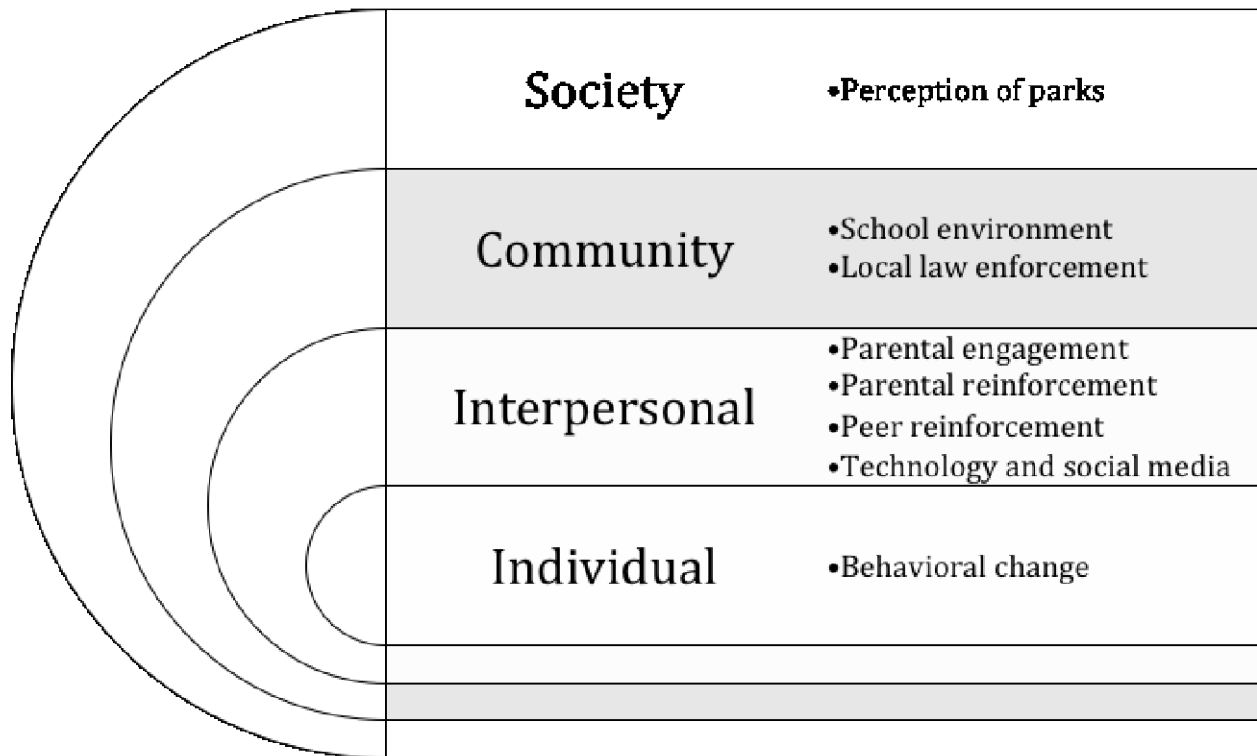


Figure 6. Pittsburgh Parks Rx within the Socio-Ecological Framework

Many of the parks prescription programs that have been implemented nationally were successful due to their ecological nature (Seltenrich, 2015). By modifying the Pittsburgh Parks Rx to embody a multi-level approach, all important factors affecting the likelihood of someone becoming obese can be considered and integrated into the program. As the program exists currently, focus is primarily placed at the individual level, seeking to make changes only to recipients’ behaviors.

While the current program design considers various aspects of behavioral change at the individual level, it does little to address the effects of interpersonal relationships. For most recipients of the Pittsburgh Parks Rx, a parent is likely their primary mode of transportation. Therefore, engagement must extend beyond the classroom to expect change to take place in the home. This can be addressed by incorporating the recommendation of the gym teachers to integrate an aspect of either the delivery or print material format that directly targets the parents. This could be done by incorporating a separate folder that includes informational resources that are more appropriate for parents rather than child and adolescent recipients. Such a folder might include information relating to park location and transportation. This could also be addressed through expanding the program to include more exposures that involve parental inclusion (e.g. during family events held at the school in the evenings, etc.).

While parents serve as a viable avenue for reinforcement, peers can also strengthen and perpetuate a program's reach. Pittsburgh Public School District gym teachers and the AHRQ agreed that social media could be an important tool when reaching youth. Technology can be utilized to extend the Pittsburgh Parks Rx program to embody a peer-to-peer level of engagement. An example of this is using Instagram to post photos of scavenger hunt findings using a specific Pittsburgh Parks Rx hash tag.

Several issues were discussed during the discussion group facilitation that exposed opportunities for program improvement at a community level. The most prevalent limitation expressed by the body of gym teachers was concern for safety in both the outside school environment and students' home neighborhoods. The Arsenal Elementary School gym teacher explained, "*Some of the neighborhoods are just so unsafe... Here [Arsenal Middle/Elementary] it's easy because it's [Arsenal Park] right here... Some of them, you never know what's going on.*

Someone might be driving by looking for a kid.” To address this issue in the current program design, several gym teachers suggested that local law enforcement should be engaged. One person suggested to *“ask the local police to join the class.”* Fostering a relationship between schools and local municipalities can be mutually beneficial. Law officers may provide their services during the school day to ensure a safe outing, and in return leaving a potentially positive impact on students’ perception of law enforcement.

While relationships with law enforcement could be leveraged to promote a safe outdoor environment during the school day, a cultural shift may be needed to impact the safety of environments outside of school. With heightened concern for the danger associated with empty parks, community efforts can be taken to transform the atmosphere of neighborhood green spaces. By summoning community organizations to utilize their local parks during routine gatherings, they may initiate a trend that inspires others to use the parks more frequently. Through increased use of the parks and the contributing interpersonal impact of a social media campaign, societal changes may take place that result in overall improvements to the perceptions of parks and park use, thus leading to an increase in physical activity in parks among youth.

5.3.2 Program Format

As identified by the gym teachers in the Pittsburgh Public School District, the current Pittsburgh Parks Rx format does not meet all the needs and limitations for each school’s environment. Additionally, many opportunities exist to increase sustainability in an environment of limited available program funding. Modifications to the program format will be proposed to address each of these areas.

First, a more flexible format should be adopted to increase the number of Pittsburgh Parks Rx exposures while avoiding the addition of any significant burden to participating gym teachers. Aspects of the Pittsburgh Parks Rx can be integrated within a pre-existing gym class agenda. For example, on a day planned for tennis, the teacher might suggest that the students try tennis at home as well. In doing so, the Pittsburgh Parks Rx message is being reinforced throughout the school year. This type of integration can also be accompanied with more specific instruction regarding which parks include publicly available tennis courts, and where tennis meet-ups and lessons are held locally. The concept of flexibility within the Pittsburgh Parks Rx should be an overall theme of the program. By providing “prescribers” with many options and allowing room for adaptations based on their school’s unique environment and limitations, the program exposure and reach will increase.

Second, focus needs to be placed on enhancing the program’s sustainability in the event of minimal or discontinued funding. Knowledge translation can play an integral role in promoting the adoption of the Pittsburgh Parks Rx as well as its continued success. By finding appropriate avenues to disseminate research to school administrators, program prescribers, and end users, health promotion messaging can be sustained long after program funding has ended.

Careful consideration should be placed on both the message and the sender of the messaging to increase perceived credibility among the end receivers. Because of the health focus of this message within the context of the parks, the message should be sent through the combined efforts of the Children’s Hospital of Pittsburgh and the Pittsburgh Parks Conservancy. By involving both parties in the delivery of the message, credibility can be established for an increased likelihood of recipient acceptance.

Knowledge translation must first occur at the school administrator level to increase perceived value in the Pittsburgh Parks Rx and its likelihood of being integrated into the school environment. Dissemination aimed at school administrators should translate the research regarding the association between physical activity and improved cognitive development (Chaddock et al., 2011; Fedewa & Ahn, 2011) and academic performance (Edwards, Mauch, & Winkelman, 2011; Stroebele, McNally, Plog, Siegfried, & Hill, 2013). To ensure the highest level of perceived credibility, the message should specifically be endorsed by the Children's Hospital of Pittsburgh. To have the greatest impact, the message should be targeted at senior-level school administrators such as district superintendents or school principals. This type of message could be sent using plain language in a letter to the receiver or a written introduction to the school section of the Pittsburgh Parks Rx website.

Dissemination aimed at prescribers should translate the research regarding the general mental and physical health benefits of park use and outdoor play. This can be done in tandem with program delivery instruction. During the small group discussions, several gym teachers expressed their interest in receiving training for the delivery of the Pittsburgh Parks Rx program. Such a platform could be used to send a tailored health message to the audience of program prescribers as well as detailed instruction and examples of program delivery.

A potential mode for providing sustainable training is through an online video made publicly available through the Pittsburgh Parks Rx website. The target audience would mostly include current Pittsburgh Parks Rx prescribers, but also those individuals interested in implementing the program but have not yet established "buy-in" at their school. The training video should be composed of two parts. Part one would include the general physical and mental health advantages of spending time outside and in the parks, while part two would include step-

by-step directions on how to implement the Pittsburgh Parks Rx program. The video could provide examples of Pittsburgh Parks Rx activities as well as potential adaptations to meet the specific needs of each school environment and student body. By using this mode of delivery, a source for messaging would be constantly available even after program funding ends.

Lastly, dissemination should take place at the end-user level. Students receiving the Pittsburgh Parks Rx curriculum should be presented with information regarding the health benefits of physical activity and park use in a way that is relevant and meaningful to them. Because the Pittsburgh Parks Rx prescribers have likely built rapport with the program recipients, they should be senders of this information. As the program format currently exists, the prescriber is instructed to engage the students in a single discussion around the benefits of park use and physical activity. During the small group discussions, several teachers mentioned that engaging in discussion during gym class was often difficult because it conflicted with students' expectations for that time period. Because of this, knowledge translation at this level should happen briefly during multiple program exposures or sessions and appear as an ongoing theme as opposed to a single guided discussion. By disseminating this information to end users, messaging has the potential to reach peers uninvolved in the original program delivery even after program funding has ended.

5.3.3 Integration Into Related Programs

Opportunities exist locally to integrate the Pittsburgh Parks Rx program into other related health promotion frameworks. Children's Hospital of Pittsburgh oversees the Healthy Schools Program in Pittsburgh, a nationwide initiative set forth by the Alliance For A Healthier Generation. The Healthy Schools Program has researched and identified the specific criteria that define a healthy

school environment (Alliance For A Healthier Generation, 2014). Through the organization's assessment tools and customized action plans, baselines for each school are determined and support is provided to create and sustain healthy school environments.

Schools in the Healthy Schools Program are reassessed annually to determine their current ranking regarding the health of their school environment. Through the implementation of the Pittsburgh Parks Rx program, a school's assessment will improve, thus incentivizing them to adopt the program.

The Alliance's Healthy Out-of-School Time (HOST) framework recognizes out-of-school time as an avenue to improve eating environments and increase physical activity opportunities among youth (Alliance For A Healthier Generation, 2013). The HOST framework defines standards and best practices for adoption by providers with aims to improve access to healthier foods and increase physical activity opportunities in youth.

The Pittsburgh Parks Rx should be adapted for use by HOST providers. In doing so, local youth will have increased opportunities for exposure to the positive messages being sent through the Pittsburgh Parks Rx program. Furthermore, pre-existing HOST activity resources can be easily integrated to enhance the Pittsburgh Parks Rx program.

6.0 CONCLUSION

Limitations will be reviewed as well as final thoughts regarding the public health significance of the Pittsburgh Parks Rx program.

6.1 LIMITATIONS

In considering the evidence and concepts I have ascertained and discussed in this paper, several limitations should be noted. First, the program development was impacted by the slightly conflicting agendas of the primary partners. With each collaborative partner prioritizing separate program activities, the Pittsburgh Parks Rx was not designed as thoughtful as it could have been.

Limited control during the program implementation presented issues related to maintaining fidelity in the delivery across multiple pilot sites. Intended outcomes were difficult to achieve when the intended program delivery format could not be maintained.

Measures utilized in the questionnaire did not produce accurate indicators. Baseline questionnaires were administered only to students in attendance in third and sixth grade gym classes at Arsenal Elementary and Middle Schools, and therefore are not reflective of the children and adolescents of the Pittsburgh area as a whole. Furthermore, students' perspectives were not captured if not in attendance during the delivery of the Pittsburgh Parks Rx program.

Due to the limited time available to implement the program at pilot sites, there were few opportunities for planned program exposure and interactions with program deliverers was brief. This impacted the overall impact of the program and led to less message reinforcement among the target population.

6.2 FINAL THOUGHTS

Obesity and its related behaviors have become a new staple in a constantly shifting culture. Because of this, it is critical to investigate and consider the use of creative ways to address and prevent the problem. Programs like the Pittsburgh Parks Rx provide a new paradigm for systematic behavioral change, and offer respite from the monotony of obesity prevention programs focused on education alone to solve the problem. With the modifications mentioned above, the program can be further improved and adapted for use in the Pittsburgh Public School District, possibly leading to a reduction in the obesity prevalence of young people in the Pittsburgh area.

APPENDIX A: CHARACTERISTICS OF PARKS RX PROGRAMS

Program Title	Agency	Target Population	Objectives	Format
Park Hop	LiveWell Greenville	Youth average aged 7 years	<ol style="list-style-type: none"> 1. Increase parks usage and discovery 2. Foster awareness and appreciation for area parks 3. Increase time spent in PA during park visits 4. Establish an annual tradition for all to enjoy 	Incentivized passport-style, summer-long scavenger hunt
DC Parks Rx	American Academy of Pediatrics District of Columbia Chapter	Children 0-18 years	<ol style="list-style-type: none"> 1. Prescribe nature to patients and families 2. Decrease impact of non-communicable chronic disease 3. Create the next generation of environmental stewards 	Database and toolkit to assist child health providers prescribe parks
Every Kid in a Park	U.S. Department of the Interior	Fourth graders	<ol style="list-style-type: none"> 1. Remove barriers to accessing our nation’s public lands and waters, with a special focus on underserved and urban communities 	Provide fourth graders with free access to national parks, national forests, national wildlife refuges, etc.

Program Title	Agency	Target Population	Objectives	Format
Greater Williamsburg Area Park Prescriptions	Parks Research Lab, College of William and Mary	Residents in the Greater Williamsburg area	1. Get citizens outside in local parks and public spaces to promote individual and community health 2. Facilitate environmental stewardship	Prescribed park use by physicians/psychologists
Healthy Parks Healthy People Bay Area	Institute at the Golden Gate	Residents of the Bay Area	1. Coordinate programmatic efforts and raise awareness through public education about the symbiotic value of health and parks	Monthly programs and activities providing safe, low-impact physical activity
Prescription Trails	New Mexico Health Care Takes on Diabetes	Residents of Albuquerque, Las Cruces, Santa Fe and Alamogordo	1. Provide all health care professionals tools to increase walking and wheelchair rolling on suggested routes, targeting and promoting healthy lifestyles for families	Toolkit for healthcare professionals
Stay Healthy In Nature Every day (SHINE)	East Bay Regional Park District and UCSF Benioff Children's Hospital Oakland	Children	1. Bring patients to the outdoors as a way to improve their physical and mental health	Trained clinic volunteers follow up with the patients' families to schedule their park visit upon recommendation of the doctor
Docs in the Park	Frederick County Parks and Recreation	Residents in Frederick, MD	1. Help reduce obesity and incidence of chronic disease 2. Foster overall wellness and healthy habits	Online tools and resources for providers and individuals

APPENDIX B: PRESCRIBER LETTER



Dear **Pittsburgh Parks Prescriber**,

Thank you so much for being a part of this fun and creative program, and encouraging kids to take advantage of their local parks as a resource in becoming more active. Getting outside is more crucial today than ever, and it is through partners like you that we can best reach today's youth.

Here are just a few science-supported benefits to prescribing parks:

1. It encourages exercise
2. It reduces anxiety
3. It improves focus
4. It makes kids smarter
5. It builds a sense of community
6. It helps them develop deeper connections with family
7. It raises their interest in the environment

On top of all of that, playing in the parks is a whole lot of FUN! But we need your help to prove it to your students. To assist you in this process, in this packet you will find the following:

- Baseline survey for administration prior to delivering the Pittsburgh Parks Rx
- Prescriber's Guide to delivering the Pittsburgh Parks Rx
- Pittsburgh Parks Rx folders for distribution among youth

We hope these resources make it easier for you to adopt the Parks Rx program, but also encourage you to tailor them to your specific needs. Good luck and thank you for bringing Pittsburgh Parks Rx into your classroom!

Sincerely,

The Pittsburgh Parks Prescription Team

APPENDIX C: PRESCRIBER GUIDE



Prescriber's Guide to Delivering the Pittsburgh Parks Rx

1. Introduction

Duration: 5 minutes

Engage youth in discussion by asking a few of the following questions:

- Where do you guys go to hangout?
- What are some of your favorite activities?
- Do you like to exercise?
 - If not, why not?
 - If so, what do you do?
- Do you like going to the park?
 - If not, why not?
 - If so, what do you do?

2. Introduce the Pittsburgh Parks Rx

Duration: 5 minutes

Introduce the Pittsburgh Parks Rx by explaining its purpose and contents:

Pittsburgh Parks Rx is a prescription for fun, outdoor play! Inside your prescription you will find:

- Calendar of upcoming events
- Park activities for any season
- Activities for Arsenal and Leslie Park
- A list of all Pittsburgh Parks
- Other ideas for getting outside and having fun

3. Pittsburgh Parks Rx Activity

Duration: 30 minutes

Describe the rules for the Arsenal Scavenger Hunt (or another activity that can be played in the parks- capture the flag, hide and seek, etc.)

4. Conclusion

Duration: 5 minutes

Engage youth in discussion by asking a few of the following questions:

- How many of you would consider inviting your friends to play at a park?
- What are some of the other things you can do in the parks (other than today's activity)?

APPENDIX D: PARTICIPANT SURVEY

Pittsburgh Parks Survey

Please complete the following survey.

1. Do you live near a park you can play in?
 - Yes
 - No

2. Do you like going to a park?
 - Yes
 - No

3. How many times do you go to a park each week?
 - Never go
 - 0-2 times
 - 3-4 times
 - More than 5 times each week

4. What do you do at a park?
 - Skate/Skateboard
 - Ride bikes
 - Swim
 - Playground
 - Climb trees
 - Sports
 - Walk/Run
 - Other _____

APPENDIX E: PITTSBURGH PARKS RX FOLDER (OUTSIDE)

Too often we underestimate the impact that **nature** and **play** have on **children's health**. In fact, studies show that one of the best ways to stay healthy is to simply step **outside**.

Parks and green spaces improve health and wellbeing, strengthen **communities**, and make neighborhoods better places to live, work, and play.

Pittsburgh Parks Conservancy, Children's Hospital of Pittsburgh of UPMC, and others have teamed up to create Pittsburgh Parks **Prescription**, or **Parks Rx**, inviting children (and adults) in every neighborhood to explore and enjoy their local parks.

This is **you**r personal Rx guide. Use the resources and ideas in here, and collect more park materials, to make Pittsburgh parks your #1 place to be **active**, improve your health, and have **FUN!**

Pittsburgh Parks Prescription

Children's Hospital of Pittsburgh of UPMC

Pittsburgh Parks Conservancy

APPENDIX F: PITTSBURGH PARKS RX FOLDER (INSIDE)

Which parks have you been to?

<p>Emerald View</p> <p>Frick</p> <p>Highland</p> <p>Riverview</p> <p>Schenley</p>	<p>Allegheny Commons Arsenal Banksville Brighton Heights Brookline Memorial Dinan East Hills Fowler Herschel Market Square McBride McKinley Mellon Moore Phillips Sheraden Southside West End West Penn</p>	<p>Able Long Albert "Turk" Graham Ammon Arlington Armstrong Baxter Blair St. Bloomfield Bon Air Boundary St. Bud Hammer Catalano Chadwick Charlies Cobden St. Cowley Craffton Dallan Davis Devlin Dunseith East Carnegie East Liberty Eleanor Street Enright</p>	<p>Esplan Fairwood Fifty-Seventh Street Fort Pitt Four Mile Run Frank Curto Frazier Gardner Garland Gladstone Heth's Joe Natali Kennard Lawn and Ophelia Leister Shreef Leolyn Lealle Lewls Lincoln Place Lookout Street Magee Marmaduke</p>	<p>McGonigle Monongahela Mutual Nelson Mandela Peace Park Niagara Oakwood Ormsby Osceola Pauline Philip Murray Revenue Robert E. Williams Spring Garden Sullivan Swasheim Townsend Tropical Tuln Vanucci Vincennes Volunteers Wabash Warrington West End Elliot Overlook Westinghouse</p>
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Keep an out for nature

Look at all the fun things to do!

There are all sorts of things happening in the parks year-round AND you can play in the parks whenever you like.

Act like an animal!
Leap like a frog, run like a deer, flap like a butterfly, dig like a groundhog, or come up with your own animal action!

Know your neighbors!
How many types of plants and animals can you name? Can you find and name 10 different trees? Birds? Bugs? Borrow a book from the library to learn more.

Stop! Look! Listen!
Go on a speedy walk or jog. On the way back, slow down and look and listen carefully. How much more nature did you notice?

Build a Stick Fort or Fairy House
Gather sticks from the ground (don't pull them off of live trees, you might hurt them!) and build a fort to sit in. If there are no big ones, make a little house for a fairy or a tiny friend.

Map an exercise course!
Choose different spots to do different exercises, and draw a map of these spots in the park. Bonus: use your exercise course weekly!

Help Keep your Park Healthy Tool
Volunteer with us: www.pittsburghparks.org/volunteerdays

PARKS

How many of these can you find? Make a mark for each one below.

Clover	Ant	Frog	Acorn	Oak Leaf
Worm	Squirrel	Flower	Maple Seed	Maple Leaf
Mushroom	Ladybug	Bird	Pinecone	Gingko Leaf
Butterfly	Deer	Berries	Rabbit	Hawk

Name: _____

Birthdate: _____



Height: _____ Weight: _____

Favorite activities: _____

APPENDIX G: PITTSBURGH PARKS RX PARK-SPECIFIC LEAFLET

SAMPLE (FRONT)

Arsenal Park

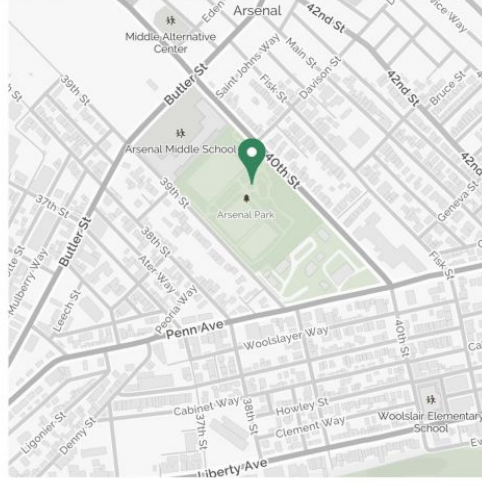


Address
Between 39th and 40th,
Butler St and Penn Ave,
Pittsburgh, Pennsylvania 15201


Hours
Mon-Sun: 6:00 am - 11:00 pm

Directions
Buses:
54C; 64; 86; 87; 88; 91; 93
With stops at Butler and 39th, 40th,
Penn and 39th, 40th





Bonus Points: Bike or hike to the park!



Facilities:



Other Resources
Friends of Arsenal Park:
<https://www.facebook.com/ArsenalParkPGH>
Citiparks: <http://pittsburghpa.gov/citiparks/>



APPENDIX H: PITTSBURGH PARKS RX PARK-SPECIFIC LEAFLET

SAMPLE (BACK)



Activities:

Home Run!

Leslie Park's two baseball fields sit opposite each other. How fast can you dash from one home plate to the other?

How Many Evergreens?

Evergreen trees, also known as conifers, are green all year round. How many evergreens can you find in Leslie Park? Can you determine their species?

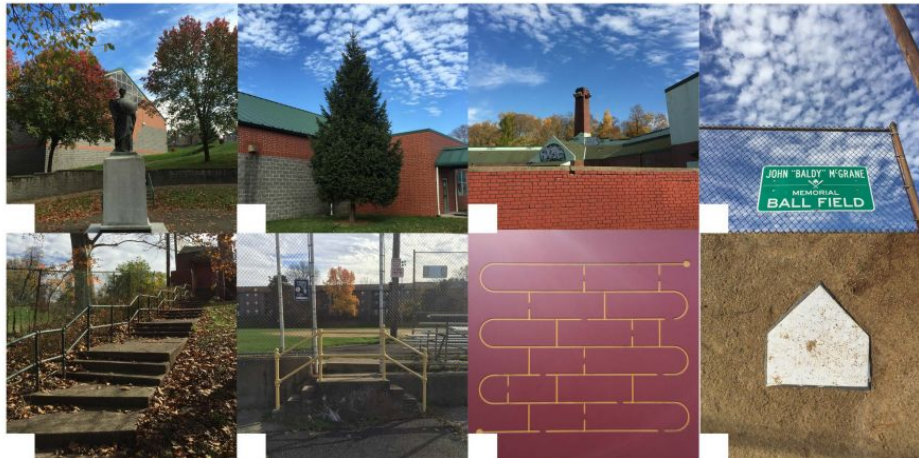
Unbeleafable!

Collect as many different leaves as you can. Challenge a friend, and see who finds the most!

Count the Stairs!

There are a bunch of stairs in Leslie Park, but do you know how many? Walk them and keep count to find out!

Scavenger Hunt:



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