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PARCS: A Safety Net Community-Based Fitness Center for Low-Income Adults

NiCole Keith, Ph.D.^{1,2,3}, Mary de Groot, Ph.D.⁴, Deming Mi, M.S.⁵, Kisha Alexander, Ph.D.^{6,7}, and Stephanie Kaiser, M.S.⁸

¹*Research Scientist*, Indiana University Center for Aging Research

²*Associate Professor*, School of Physical Education and Tourism Management

³*Investigator*, Regenstrief Institute, Inc.

⁴*Associate Professor*, Diabetes Translational Research Center, Indiana University School of Medicine

⁵*Biostatistician*, Division of Biostatistics, Indiana University School of Medicine

⁶*Wellness Solutions Manager*, Accountable Health Solutions

⁷*Faculty*, University of Phoenix

⁸*Fitness Center Manager*, National Institute of Fitness and Sport

Abstract

Background—Physical activity (PA) and fitness are critical to maintaining health and avoiding chronic disease. Limited access to fitness facilities in low-income urban areas has been identified as a contributor to low PA participation and poor fitness.

Objectives—This research describes community-based fitness centers established for adults living in low-income, urban communities and characterizes a sample of its members.

Methods—The community identified a need for physical fitness opportunities to improve residents' health. Three community high schools were host sites. Resources were combined to renovate and staff facilities, acquire equipment, and refer patients to exercise. The study sample included 170 members age 18yr who completed demographic, exercise self-efficacy, and quality of life surveys and a fitness evaluation. Neighborhood-level U.S. Census data were obtained for comparison.

Results—The community-based fitness centers resulted from university, public school, and hospital partnerships offering safe, accessible, and affordable exercise opportunities. The study sample mean BMI was 35 ± 7.6 (Class II obesity), mean age was $50\text{yr} \pm 12.5$, 66% were black, 72% were female, 66% completed some college or greater, and 71% had an annual household income < \$25K and supported 2.2 dependents. Participants had moderate confidence for exercise

participation and low fitness levels. When compared to census data, participants were representative of their communities.

Conclusion—This observational study reveals a need for affordable fitness centers for low-income adults. We demonstrate a model where communities and organizations strategically leverage resources to address disparities in physical fitness and health.

Keywords

Race; gender; age; exercise; disadvantaged

Introduction

Adults residing in low-income, inner-city communities are less likely to meet the U.S. Department of Health and Human Services recommended guidelines of 150 minutes of moderate to vigorous physical activity/week (1). Individual and environmental factors are associated with physical inactivity among low-income urban adults including physical, psychosocial and environmental (e.g., built environment) context (2-5). The absence of accessible and affordable resources to facilitate physical activity participation are known barriers within low-income urban communities when compared to more affluent areas (6-8). Research focused on physical activity participation and the overall health of inner-city community residents demonstrates that residents are more likely to be physically active when opportunities for physical activity are perceived as being relatively easy to access and suitable for their ability level (9-12).

Similar to ‘food deserts’ where convenience stores are the primary food source and consumers’ choices are limited to tobacco, liquor and high-fat, processed foods (13-15), *exercise deserts* can be characterized as built environments with limited walkability, access to green spaces and/or affordable fitness facilities that promote physical activity and fitness among poor and underserved communities (16, 17). In the greater Indianapolis area, as with many other American cities, GIS mapping demonstrates the geographic correlation between high obesity prevalence and poverty. Within the same geographic boundaries there are few exercise facilities that offer affordable memberships to residents with limited resources (Figure 1). Areas outlined in bold, red contain a population where more than 35% of the residents live in poverty and more than half are obese. Across studies, data suggest that in order to more completely attend to physical fitness-related health disparities, exercise outlets to address built environment deficiencies *and* access to affordable health-fitness professionals are needed in low-income neighborhoods (9, 11, 18-21).

Figure 1 also illustrates the YMCA locations serving the metropolitan service area (MSA) of Indianapolis during the time of this study. Within the United States, the YMCA has a strong commitment to investing resources to improve community health. However, most YMCA locations in the MSA of Indianapolis would require that inner city residents travel *10 miles* or more to the closest facility. In the Indianapolis area, like many other cities, public transportation to suburban communities is limited which makes access to these facilities difficult. Only two YMCA sites were centrally located and both were downtown; a higher SES area with lower obesity prevalence. Although the YMCA provides sliding scale

income-based memberships, many low-income residents still cannot afford the fees (22-24). Improving the health and fitness of this community would require change by actions from a diverse group of community constituents and evidence that there is actually a community need for a fitness resource.

The current study is across-sectional, observational design that describes community-based fitness centers established for adults living in low-income, urban neighborhoods and characterizes a sample of its members. We also present US Census data of all residents living in the communities that host these fitness centers and evaluate whether members were representative of their communities and whether these communities needed fitness centers.

Methods

Partnership

To address limitations in accessible and affordable exercise opportunities as well as other needs, Physically Active Residential Communities and Schools (PARCS – formerly Fit for Life) was founded in 2001 as a result of a partnership (see Figure 2) between the Indianapolis Public School (IPS) System, Indiana University - Purdue University, Indianapolis (IUPUI) Department of Kinesiology, and a weight management program located in Federally Qualified Health Centers (FQHCs) that are part of Indiana's largest public hospital system (25-28). The primary goals of PARCS are to (1) offer sustainable opportunities for community members to exercise in a facility that delivers supportive services, (2) provide teaching and learning opportunities for university faculty and students, and (3) provide primary care providers with fitness referral sites that are prepared to work with their patients. All partner sites were located within a 3 mile radius of IUPUI. The community was defined by the partner stakeholders and constituents who all lived and/or worked within the area highlighted in bold, red outline (Figure 1). In a community assessment, community leaders listed poor health as one major threat to community sustainability (28). At the same time FQHC primary care providers were queried about the reasons their patients were not referred to exercise. Location, affordability, and the ability of a fitness professional to manage their patients with multiple comorbidities were listed reasons (29). Lastly, IUPUI Kinesiology students who were generally highly fit, young individuals from suburban and rural communities were training to be fitness and/or health professionals (many Kinesiology students go on to careers in hospital-based disease prevention and treatment or community health promotion) (30). However, few IUPUI Kinesiology students had experience with urban residents who had comorbid conditions – a population they would likely encounter during their professional careers. IUPUI faculty believed it was important to improve the skills and perceptions that Kinesiology students generally have regarding obese people (31, 32).

PARCS was designed to create a series of safety net fitness facilities to meet the needs of all community partners. Similar to safety net FQHCs that provide health care for patients who are uninsured or underinsured (33), these safety net fitness facilities were conveniently located and provided access and services to members who could not afford regular or sliding scale, income-based fitness center memberships. From 2002-2009 there were 3 PARCS locations (shown in Figure 1): George Washington Community High School, Thomas Carr

Howe Community High School and Emmerich Manual High School. These IPS-designated “Community Schools” were already open to the community for shared-use. IPS leaders indicated these sites would be best suited to host public fitness centers. Programming for adult community members occurred after school hours. IUPUI Kinesiology students were supervised by faculty to serve as personal trainers and fitness instructors at each of the PARCS locations as they received professional preparation and academic course credit. Approximately 150 students enrolled across five academic classes each semester performed service learning activities at PARCS. Activities included health and fitness assessments, writing exercise prescriptions, creating exercise programs, leading group exercise, and/or offering personal training. Activities were tied to the objectives of the courses in which the Kinesiology majors were enrolled. Cost-savings also occurred by using high school fitness facilities to house the program. Most fitness center equipment was accrued through grant funding acquired by the partners or through donations. PARCS membership fees, \$20 per year, were collected by the host high schools to help maintain the facility and its equipment. In 2011, in response to school consolidation by IPS, PARCS moved to a new, larger, state-of-the-art facility on IPS property near two of the previous high schools. PARCS continues to operate in one of its original high school locations and over 3,000 people have joined over a 13 year span. School, community leaders, PARCS members and FQHC providers continue to advise PARCS leaders about programming and student staffing. The PARCS Program Director also attends regular community meetings. Partners pooled resources to establish PARCS as a community asset that could address their separate problems.

In this paper we characterize PARCS members through demographic, physical activity, exercise self-efficacy, quality of life, health, and physical fitness data for a sample of PARCS members. Study protocol was determined by community partners who agreed that characterizing the PARCS program would require both qualitative and quantitative data. These data were obtained simultaneously and only quantitative data are presented in this report. Study approval was obtained from the Indiana University Institutional Review Board by the faculty investigators. The principal investigators trained 8 research assistants (RAs) to collect both demographic and physical data. RAs participated in quarterly refresher training sessions and met investigators weekly to discuss study progress over an 18-month period. Over this period, all PARCS members age 18 were sent a letter requesting their participation in the research study. We sent letters in waves of 200 and called members up to 3 times or until we received a response. Once the wave was complete, another group of letters were mailed until all members for whom we had addresses were sent a letter. Flyers were placed at PARCS locations and distributed by research assistants to members. Members were asked to call a local study phone number to receive additional information and enroll in a research study.

Members who agreed to participate in the research received instructions when their appointment was scheduled with a trained RA at a PARCS site. Instructions were delivered again during a reminder phone call that occurred the day before the scheduled test. Testing occurred during regular fitness center hours (between 4:00 P.M. and 7:00 P.M.) at a time when members were available for an appointment. Upon arrival to their scheduled appointment, participant informed consent was obtained by the RA. All measures were

performed in a single visit and took approximately 90 minutes to complete. Participants received \$20 after the visit.

Measures to support the community need

Surveys evaluated demographics, health history, exercise self-efficacy, physical activity participation, and quality of life. All survey measures were led and participant responses were recorded by a RA who also was a trained interviewer. Immediately following survey completion, physical testing was performed.

Demographics and Health History—Participants provided demographic information such as date of birth, highest completed grade, and annual household income. The Health History Questionnaire asked participants to indicate the presence or absence of cardiovascular disease risk factors (eg, family history, smoking, hypertension, etc.). The number of risk factors participants reported at present were summed for analyses with a range of zero to six.

Exercise self-efficacy was measured using the 18-item Exercise Self-Efficacy Scale to assess confidence in engaging in exercise in the context of 6 common barriers (negative affect, excuse making, exercising alone, lack of access, resistance from others, and bad weather) on a 5-point Likert scale (1 = Not at all confident; 2 = Somewhat confident; 3 = Moderately confident; 4 = Very confident; 5 = Completely confident). The measure has been found to have adequate internal consistency ($\alpha = .76$ to $.82$) and good construct validity (34-36) and has good internal validity and adequate external validity in Non-Hispanic blacks with a coefficient $\alpha = .80$ and factor loadings from each of the six barriers ranging from $.49$ to $.70$ (37).

Yale Physical Activity Scale (YPAS)—The YPAS is a comprehensive survey that measures physical activity behaviors performed in the past month across various intensity levels and in multiple domains including leisure and vigorous walking; heavy housework and yard work; jogging and playing basketball; climbing stairs; standing and moving around; standing without moving around; and sitting. Summary score indices were determined for each domain (vigorous activity, leisure walking, moving, standing, and sitting). The YPAS has relatively good test-retest reliability with correlation coefficients ranging between $.42$ and $.65$ (38). For this study, the five activity dimensions were scored (adjusted for intensity of activity) and summed to create an activity dimension summary index (ADSI), expressed as total units for each participant to summarize activity levels and intensity for the past month. Scores ranged from 0 to 145 and higher scores indicate more activity. Other studies have used this tool in a variety of age and race groups and have found good validity and reliability (39).

SF-36 Quality of Life—The Short Form Health-Related Quality of Life (SF-36) survey was administered as an overall health-related quality of life measure. The 36 items evaluate eight domains of health: Physical Functioning (ability to engage in physical activities), Role-Physical (impact of physical health on role-based activities), General Health Perception (global assessment of health), Vitality (energy, fatigue), Social Functioning (physical or

emotional health impact on social activities), Role-Emotional (impact of emotional health on role performance) and Mental Health (depression, anxiety). Scales are calculated on a 100-point scale where higher scores indicate more favorable levels of functioning (22). In addition, physical component scores (PCS) and mental component scores (MCS), derived from all of the domain subscales, were calculated and standardized on a 100 point scale with 50 as the median, and normed using 1998 US Census data.

Health and fitness measures occurred in the following order

Anthropometric measures—Height and weight were measured using a wall mounted stadiometer and a calibrated digital scale to the nearest pound. Calibration of the scales was performed quarterly or as needed. BMI was calculated post-hoc using a formula [weight (kg)/height (m)²].

Resting heart rate and blood pressure—Resting heart rate was palpated from the participant's left radial artery (unless otherwise instructed by the participant). The number of beats were counted for 15 seconds, and then multiplied by four. Resting blood pressure was measured on the left arm (unless otherwise instructed by the participant) using a manual sphygmomanometer and stethoscope.

Muscular strength and endurance—Muscular strength and endurance were measured through the partial curl-up test based on the American College of Sports Medicine protocol (40). Participants performed as many repetitions as possible in one minute without stopping (maximum of 25 repetitions). The test was terminated if the cadence of 40 beats/minute was broken and only full repetitions were counted. Scores range from 9 to 25 and the classifications include “needs improvement,” “fair,” “good,” “very good,” and “excellent.” A higher score is a better score (40).

Muscular Flexibility—Lower body flexibility was assessed using the chair sit and reach protocol (41). The participant was instructed to bend one leg while straightening the other and to reach down the straight leg as far as possible, holding this position approximately two seconds. The score was recorded as the most distant point (in centimeters) from the fingertip to the toe. The test is scored as follows: < 0.5 is below average, 0.5 to 6.5 is average, and > 6.5 is above average (42).

Upper body flexibility was assessed using the back scratch protocol (43). The final score was recorded to the nearest half inch, measuring the distance of overlap or distance between the tips of the middle fingers. A negative score was given if the middle fingers did not touch, a zero if middle fingers touched and a positive score if the middle fingers overlapped. The test is scored as follows: < -1 is below average, -1 to 3 is average, and > 3 is above average (42).

U.S. Census Data—Data from the 2010 U.S. Census were gathered in collaboration with the IUPUI Polis Center data system to provide a sociodemographic comparison of PARCS members and neighborhood residents living in the areas where PARCS sites were located. Demographic data were drawn at the census tract level. Geocoding was used to identify the census tracts where study participants lived.

Statistical Analyses

Analyses were conducted using R (R Core Team, 2013). Continuous variables were summarized with mean and standard deviation. Categorical variables were summarized using frequency counts and percent. Variables were assessed for normality and heteroskedasticity.

Results

Partner-generated financial support for this research established a recruitment goal of 200 members in an 18 month time period. We reached 85% of that goal and a total sample of 170 members from the 3 PARCS locations volunteered for this study. All participants completed all measures. Demographic characteristics are shown in Table 1. Across the sites, the mean age was 49.9 years (S.D. 12.5). Sixty-six percent of the sample self-identified as African-American or black, 72% were female, 64% reported completion of some college or greater, 71% reported an annual household income of less than \$25,000 with an average of 2.2 dependents (S.D. 1.3), 51% percent reported working outside the home, and 50% reported considerable financial strain.

Exercise self-efficacy results are presented in Table 2. Findings indicated moderate confidence in participants' ability to engage in exercise in the context of a variety of common barriers (eg, exercising alone, lack of access, resistance from others).

Scores for the YPAS activity dimension indices (Table 2.) show that the population had a moderate level of engagement in overall physical activities with a mean score of 52.2 (S.D. 28.3) out of a possible score of 145. Participants showed high levels of engagement in vigorous activities with a mean score of 28.8 (S.D. 20.7) out of a possible score of 60 and reported less engagement in lower-intensity exercises (moving, sitting, and standing).

Evaluation of health-related quality of life (SF-36) domains (Table 2.) indicated that the highest ratings were observed in social functioning (impact of physical and emotional health on social functioning such as social isolation associated with limitations to physical mobility) and role-emotional functioning (impact of emotional health on role performance such as the impact of depression on ability to work). The mean score for the PCS (summary score for physical functioning) fell between the 25th and 50th percentile for the general U.S. population. The mean score for the MCS (summary score for mental health functioning) was just below the 50th percentile for the general U.S. population.

Health and Fitness Indices

Fitness evaluation data are presented in Table 3. The average number of self-identified CVD risk factors was 2.0 (S.D. 1.6). This sample of fitness center members was generally obese with an average BMI of 35.0 (S.D. 7.6). The average resting heart rate indicated below average cardiovascular fitness. The mean systolic blood pressure revealed prehypertension while the diastolic blood pressure was within normal range. Partial curl up scores yielded a "good" classification. (40) Participants also demonstrated below average lower-body flexibility (chair sit and reach test) and average upper-body flexibility (back scratch test) (41, 44).

U.S. Census Comparisons

U.S. Census tract data from 2010 were examined for 20 neighborhood-level tracts where the largest number of study participants lived (Table 1). All tracts reported a roughly even gender distribution. Examination of racial proportion demonstrated that 48.8% of community residents were African American, 61% had a high school diploma or lower, 41% had an income of < \$25,000, and 85% of the population residing within these census tracts worked outside of the home.

Results Summary

Objectives of this research included characterizing the health and fitness of PARCS members and barriers that would prevent community member access to a fitness center without the existence of PARCS. Study results and US Census data (Figure 1) show PARCS members who agreed to participate in this study and residents living in the communities surrounding PARCS sites both demonstrate a need for affordable fitness options due to their economic situation and physical condition. Figure 1 shows that PARCS was established in communities where, according to US Census data, 35% of the population lives in poverty and 53.5% to 70.2% are overweight or obese, depending on the neighborhood. Research participants were generally obese with 2 cardiovascular disease risk factors and moderate confidence in their ability to exercise in the face of barriers. Cost is a recognized barrier to exercising in a fitness facility; 71% of the participants reported an income < \$25,000, 50% reported high levels of financial strain and 40% reported moderate levels of financial strain. Results support a demonstrated need for financially and geographically accessible fitness programs.

Discussion

These data reveal one of the few presentations of demographics, quality of life, physical activity participation, exercise self-efficacy, and physical fitness among a low-income sample of members who joined a safety net fitness center. Organizations (a public school system, a university, and FQHCs) have collaborated to offer sustainable public exercise options for over 13 years. Public schools can be used to promote adult physical activity, provide diverse clients to support university student learning, and offer affordable and accessible sites where providers can send their patients with comorbidities to safely exercise. Partners worked to generate funding, equipment, staff, and community member support to create a program which fulfilled their mutual and self-interests. PARCS was formed and sustained during economically uncertain times, especially for IPS. The enduring commitment to community health by multiple institutions serves as a model for what is possible in other communities where goals are shared and prioritized across institutions.

A key finding of this research is the majority of participants had limited discretionary income to pay for a regular or sliding scale fitness center membership. Research suggests that greater life demands on low-income populations coupled with limited access to fitness facilities negatively influence physical activity participation (8, 16, 22-24). Including physical activity within the community needs assessment was an important facilitator of this partnership. Both policies and planning for safety net fitness centers such as PARCS could

aid in addressing low physical fitness and perhaps, eventually reduce health disparities for residents of low-income communities.

Self-report data revealed that, on average, study participants had two cardiovascular disease risk factors. Measured data showed participants had high resting heart rates (indicating poor cardiovascular health), were pre-hypertensive, generally obese and demonstrated generally moderate or low fitness in nearly every measured category. Our sample represented groups (e.g., low-income, racial-ethnic minority, living in under-resourced communities) who have a higher incidence of obesity and are at greater risk for cardiovascular disease (45, 46). Additionally, 56% of our sample received a FQHC medical referral. In 2012, the Institute of Medicine (IOM) recommended health care providers perform routine behavior assessments including physical activity screening. It also was recommended that providers advocate for physical activity resources for their patients and within the communities where their patients live (21). While PARCS existed long before the IOM recommendation, the partnership and program are consistent with the IOM guidelines.

This observational cross-sectional study designed to characterize the demographic, psychological and fitness characteristics of these sites had several limitations. PARCS was developed to serve rather than study its members. We learned to propose research only after a strong partnership was established. Permission to present all assessment results was not a membership requirement. Also, many phone numbers were no longer in service and mail was returned with no forwarding address, thus obtaining retrospective consent to present all member comparison data was not possible. Instead, we present US Census data to demonstrate that residents living in the communities surrounding PARCS were similar when compared to study participants. IPS Schools collected membership fees but did not record join dates so there is no record of the length of time any members, including study participants, were PARCS members. Health and fitness data show that the members who volunteered for this research were obese with 2 or more self-reported CVD risk factors and on average were pre-hypertensive (based on measured resting blood pressure). This demonstrates there is still a need for this group to exercise regardless of whether their health status was positively impacted by engaging in physical activity at PARCS. There was no attempt to apply culturally-specific approaches to members. Rather, the program was tailored to the needs and preferences of individual participants. We attempted to evaluate cardiorespiratory response to exercise (e.g., exercise heart rate and blood pressure) however, due to the fitness center's environment (loud music, several machines being used simultaneously, and people talking) the data that we received were deemed unreliable and we only include resting cardiorespiratory measures in this report. Here we report one portion of this research study. The entire evaluation also included qualitative data collection of members who volunteered for the study, faculty and students as well as key informant interviews of community stakeholders. These data will be presented in future reports.

Efforts to increase the reach and participation levels of community-based programs will require a combination of individual and program level focus. We found that community members with generally low physical fitness will make use of an accessible fitness resource despite financial barriers and poor health status. Particular deficiencies in health and physical fitness within health disparate populations could be addressed by creating

affordable, accessible exercise opportunities. Such efforts require open, honest, purposeful, and continued communication among partners who are trusting of and willing to make adjustments with leaders and constituents from each group. PARCS serves as one model where communities and organizations leverage their resources through strategic collaboration to address the needs of urban residents living within exercise deserts.

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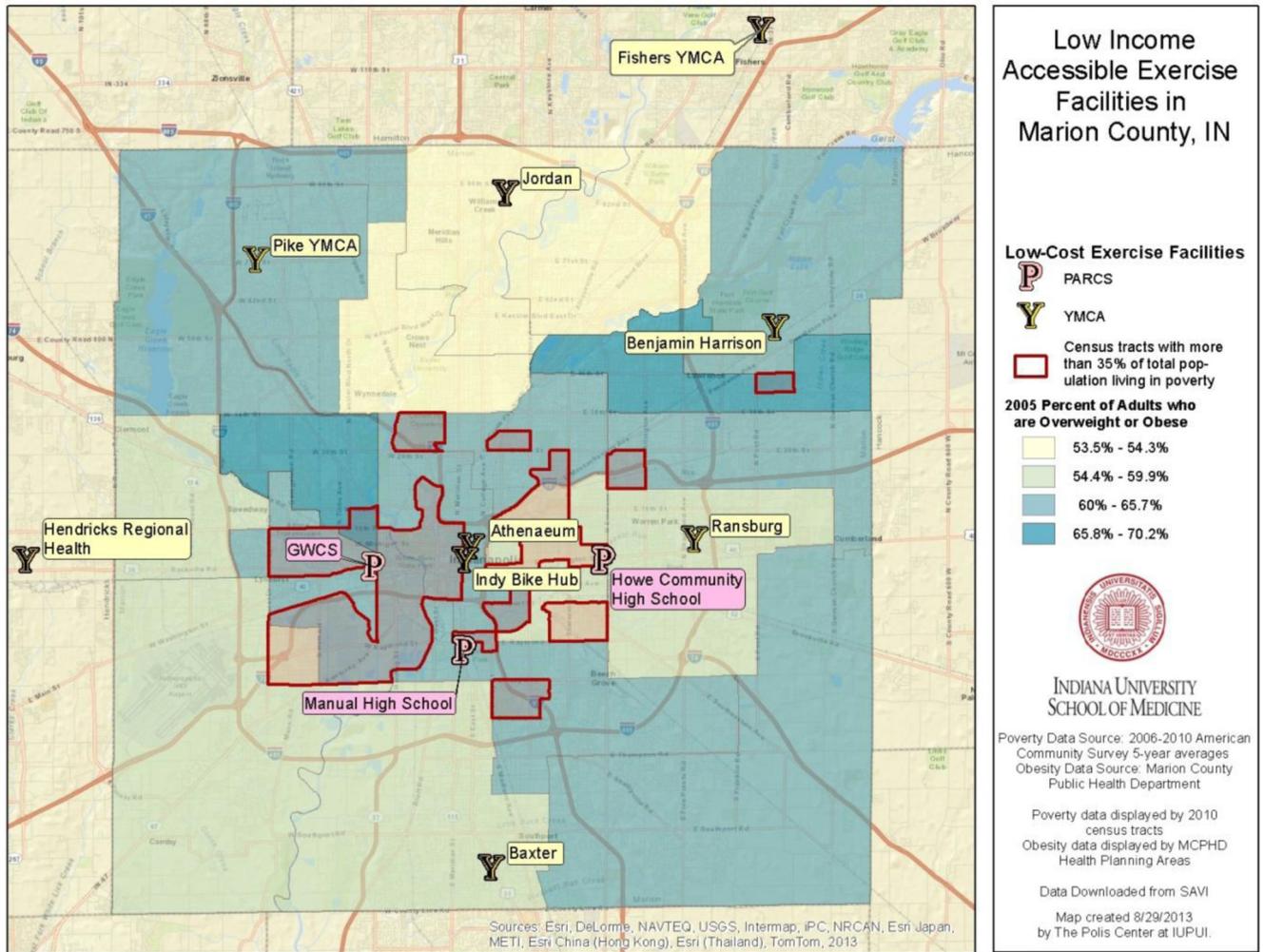


Figure 1. Prevalence of Obesity, Poverty and Locations of Affordable Fitness Facilities in the Metropolitan Service Area of Indianapolis

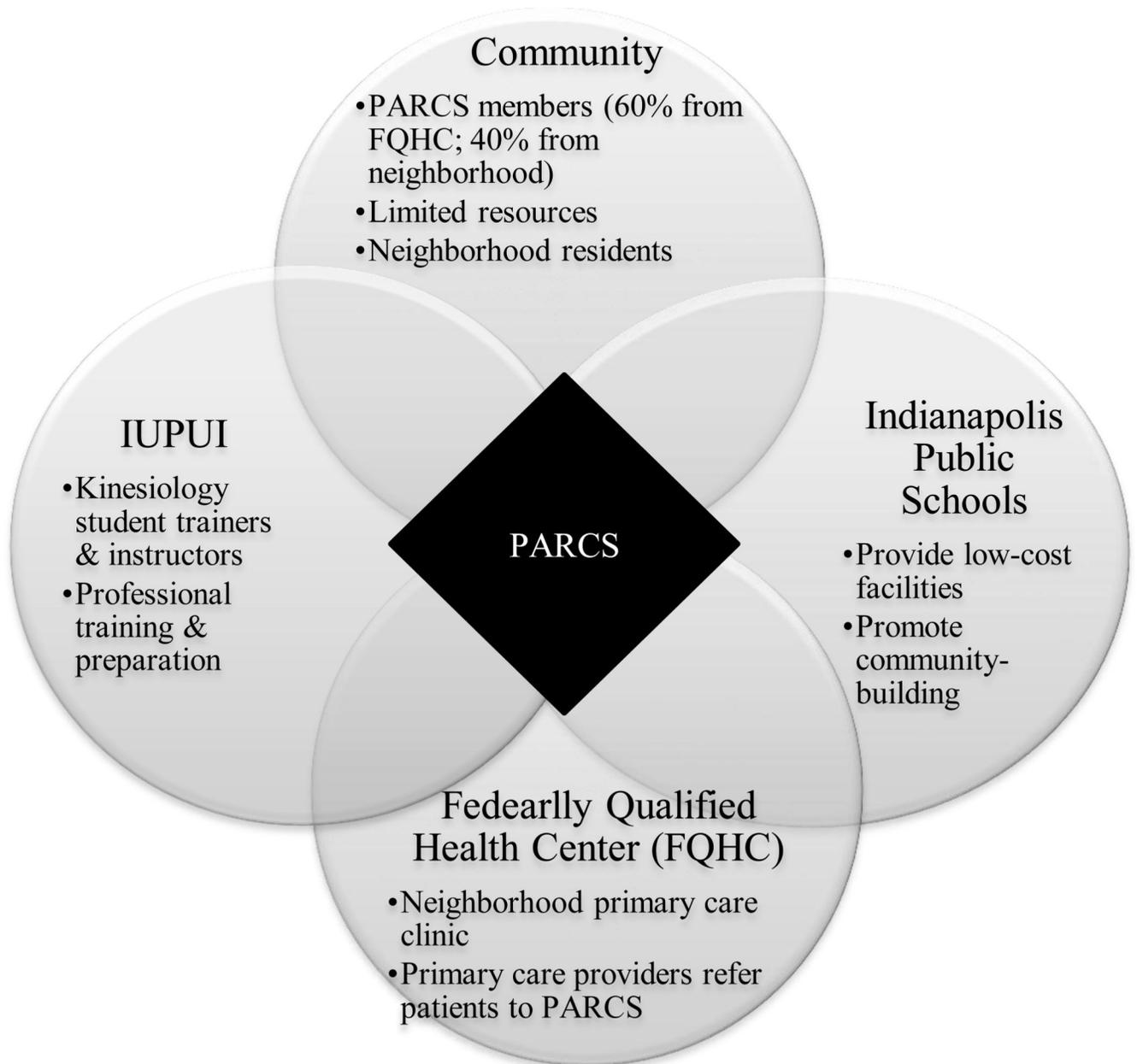


Figure 2. Community Members and Partners Relationships and Contributions

Table 1
Demographic Characteristics of PARCS Participants and Neighborhood Census

	PARCS Participants N=170		2010 U.S. Census Tract Data*
	N	%	
Age (Mean, S.D.)	49.9	12.5	--
18-44 Years	53	31%	48%
45-64 Years	97	57%	33%
65 Years and Older	20	12%	11%
Gender			
Male	48	28%	48%
Female	122	72%	52%
Race			
White	57	34%	33%
Black	113	66%	49%
Marital Status			
Married	69	41%	36%
Widowed	13	8%	7%
Divorced	43	25%	15%
Separated	9	5%	--
Never Married	36	21%	43%
Education			
Without High School Diploma	13	8%	25%
High School Diploma Only	42	26%	36%
Some College or Trade School	56	34%	19%
Associate Degree or greater	53	32%	19%
Income			
<\$25,000	120	71%	41%
\$25,000-\$49,000	34	20%	32%
\$50,000-74,999	8	5%	16%
>\$75,000	6	4%	13%
Home Ownership			
Yes	69	42%	41%
Work Outside of the Home			
Yes	88	52%	85%
Number of Dependents (Mean, S.D.)			
	2.2	1.3	
Difficulty Making Ends Meet			
Very Hard	43	25%	
Hard	42	25%	
Not Hard, Not Easy	68	40%	

	PARCS Participants N=170	2010 U.S. Census Tract Data*
Easy	13	8%
Very Easy	4	2.4%
Difficulty Paying Bills		
Yes	75	45%
Financial Situation in the Past Year		
Getting Better	48	29%
Staying the Same	90	54%
Getting Worse	29	17%
Financial Satisfaction		
Very Satisfied	5	3%
Somewhat Satisfied	27	16%
Neither Satisfied or Dissatisfied	46	27%
Somewhat Dissatisfied	56	33%
Very Dissatisfied	34	20%
Hopeful About Financial Situation		
Pretty Hopeful	91	54%
More or Less Hopeful	65	39%
Not Hopeful At All	11	7%

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Table 2
Psychosocial & Physical Activity Characteristics of PARCS Participants (N=170)

	Mean	S.D.	Possible Range
<i>Psychosocial Characteristics</i>			
Exercise Self-Efficacy	3.3	0.9	0-5
SF-36 Survey			
Physical Functioning	78.2	27.4	0-100
Role Physical	73.5	38.9	0-100
General Health Perception	69.2	19.8	0-100
Mental Health Score	76.7	16.9	0-100
Vitality	62.4	19.8	0-100
Social Functioning	82.3	22.3	0-100
Role Emotional	73.4	38.9	0-100
Physical Component Score (PCS)	47.7	11.1	0-100
Mental Component Score (MCS)	51.3	9.9	0-100
YPAS Activity Dimensions Index			
Summary index	52.2	28.3	0-145
Vigorous activity index	28.8	20.7	0-60
Leisure walking index	10.5	8.3	0-48
Moving index	10.5	4.4	0-18
Standing index	3.6	2.7	0-15
Sitting index	2.4	1.0	0-4

Table 3
Health and Fitness Characteristics of PARCS Participants (N=170)

	Mean	S.D.
<i>Health/Physical Characteristics</i>		
Number of CVD Risk Factors	2.0	1.6
Body Mass Index	35.0	7.6
Weight (kilograms)	96.6	22.3
<i>Fitness Characteristics</i>		
Resting Heart Rate (beats/minute)	76.7	12.2
Resting Systolic Blood Pressure (mmHg)	125.8	13.0
Resting Diastolic Blood Pressure (mmHg)	76.6	8.6
Partial Curl-Up (total number)	11.5	10.2
Sit-and-Reach Test (centimeters)	2.2	10.12
Back Scratch Test (centimeters)	-10.3	15.6

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