The Development and Pilot Testing of Active Kids: A Park-Based Afterschool Physical Activity Program for Hispanic Youth

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Abstract

Purpose: Physical activity (PA) in children is associated with decreased obesity and risk for preventable diseases. The purpose of this study was to analyze the effectiveness of a twice weekly, 15-week games-based afterschool PA intervention at a local park for Hispanic youth. **Methods:** Pedometers and heart rate (HR) monitors were used to assess PA duration and intensity. Pre- and posttest measures of body mass, waist circumference, skinfolds, cardiovascular fitness, and blood pressure were compared on 18 participants (11 girls, 7 boys, ages 8-11, 45% overweight) who attended the program at least 65% of the sessions. **Results:** The program provided a mean of 29 minutes of PA of moderate to vigorous intensity (HR > 130 beats/min) each session, averaging 2,043 - 3,370 steps per session. Participants displayed significantly improved cardiovascular fitness pretest to posttest. Over time, body mass index and body mass increased significantly; however, the proportion of overweight youth did not change. There were no significant changes in skinfold thickness, waist circumference, or blood pressure. **Conclusion:** A community PA intervention with a games-based curriculum meeting twice weekly has the potential to improve cardiovascular fitness, providing benefits of PA consistent with public health recommendations.

Keywords: physical activity, youth, parks, cardiovascular fitness

Introduction

Current recommendations indicate that youth should engage in moderate to vigorous physical activity (MVPA) for 1 hour per day (Strong et al., 2005; U.S. Department of Health and Human Services, 2008) to prevent cardiovascular disease and its comorbidities. More physically active or more aerobically fit youth present lower body mass index (Eisenmann, Bartee, & Wang, 2002), less insulin resistance (Rubin, McMurray, & Harrell, 2008), and lower values of cardiovascular risk factors (Eisenmann et al., 2005). Increased physical activity and weight management also have significant implications for the psychological and emotional well-being of youth (Schwimmer, Burwinkle, & Varni, 2003; Wardle & Cooke, 2005). Physical activity interventions generally take place in one of three broad settings: at home, at school, or in the community (Ward, Saunders, & Pate, 2007). Community-based interventions include those in affiliation with churches (Fitzgibbon, Stolley, Dyer, VanHorn, & KauferChristoffel, 2002), parks (Bush et al., 2007), clinical centers (Nemet et al., 2005), or afterschool programs (Gutin & Owens, 1999).

Afterschool physical activity programs for children serve many important purposes. Approximately 50% of a child's waking hours take place as discretionary time outside of school (Larson & Verma, 1999), during which time opportunities for supervision and skill-building are essential (Mahoney, Harris, & Eccles, 2006). Additionally, the provision of physical education in schools is challenged by budget and time restrictions (Pate et al., 2006), thereby limiting physical activity opportunities during school hours. Activities at home are also increasingly sedentary, and are dominated by youth's use of electronic media (television, internet, video games), on average, more than six hours per day (Roberts, Foehr, & Rideout, 2005). A lack of opportunities to be physically active at school or at home leaves few opportunities for children to capitalize on the many benefits of regular physical activity, thereby placing an emphasis of the afterschool environment as a mean to provide this opportunity (Beets et al. 2010).

Limited research has examined the relative effectiveness of different physical activity approaches, and it is not clear to which types of physical activities children, particularly Hispanic children, may be most responsive. Traditional exercises, such as fitness drills, resistance training, and use of stability balls, may be effective to some extent (Bush et al., 2007), but alternative, game-based approaches may be more motivating for children (Wiersma & Sherman, 2008). Designing and testing interventions that consist of games-based approaches is thus warranted.

The *Active Kids* program was designed and carried out in a collaborative effort between California State University, Fullerton, the City of Fullerton (CA), and the YMCA of Orange County (CA), to offer a 15-week afterschool physical activity intervention designed for underserved Hispanic youth. The Hispanic population is the largest minority group in the United States (U.S. Census Bureau, 2003), presenting high risk for the prevalence of obesity (Eisenmann et al., 2002) and its associated comorbidities (National Heart, Lung, and Blood Institute, 2003; Shaibi et al., 2005). A lack of quality health care, a common occurrence for many Hispanic American families (Flores, Olson, & Tomany-Korman, 2005) and their suboptimal participation in physical activity (Butte, Puyau, Adolph, Vohra, & Zakeri, 2007; CDCMMWR, 2006) increases their risk for disease (Andersen et al., 2006; Moore et al., 2003; Rubin et al., 2008; Strong et al., 2005). The purpose of this paper is to present the design of the *Active Kids* program (a pre-posttest design with no control group) and a preliminary evaluation of its efficacy with respect to 1) adequate dose of physical activity in agreement with current recommendations for youth, and 2) improvement of body composition, cardiovascular parameters, and cardiovascular fitness.

Methods

Participants

The program was marketed to children ages 8-11 who lived in a primarily Hispanic, underserved neighborhood near a downtown section of Fullerton, CA (city population: 132,000) and who attended an elementary school (93% Hispanic) adjacent to the park. The participants (n = 20) signed an assent and their parents or guardians signed an informed consent approved by the Institutional Review Board of the California State University, Fullerton. Participant characteristics are presented in Table 1.

Table 1

Anthropometric characteristics of sample by sex

Variable	Girls (n=11)		Boys (n=7)		*p*-value
	Mean	SD	Mean	SD	
Age	9	1.7	7.5	1.7	0.110
Height (cm)	135.5	12.2	125.0	12.6	0.098
Weight (kg)	36.3	15.8	28.7	6.6	0.246
BMI	19.0	5.0	18.1	1.6	0.661
WC (cm)	68.5	14.1	61.7	6.6	0.255
Triceps Skinfold (mm)	16.2	7.7	12.1	5.0	0.251
Subscapular Skinfold (mm)	13.4	8.8	7.7	3.2	0.144
Body Fat %	25.4	6.6	18.5	6.3	0.052

WC = Waist Circumference

Active Kids Program Description

Active Kids was a federally funded program through the Centers for Disease Control and Prevention to test the effectiveness of an afterschool physical activity program for underserved youth. The research objectives of the study were to: 1) assess the extent to which the games-based curriculum could provide recommended levels of physical activity with respect to amount and intensity (Janz, 1994; Strong et al., 2005); and 2) determine if changes in body mass index, blood pressure, aerobic capacity, waist circumference, or body composition occurred during the 15-week intervention.

The program philosophy, design, and implementation was developed based, in part, from previous evidenced-based research (e.g., Sallis, 2003; Strong et al., 2005), PA promotion theories (e.g., Krizek, Birnbaum, & Levinson, 2004; Welk, 1999), and previous accounts of "what works" with or is desired by youth with respect to physical activity programming (Neumark-Sztainer & Story, 1997; Robert Wood Johnson Foundation, 2005). A noncompetitive games-based approach offering a broad exposure to small and large group activities was implemented (described below) for its potential to increase intrinsic reasons for youth to engage in regular PA and to ensure variety, enjoyment, and interest, regardless of previous skill level (Strong et al., 2005). Although other interventions have used routine structured exercise or sports specific skill development approaches, a games-based approach has the potential to decrease motivation of less-fit children and may have the greatest potential to increase enjoyment of free-time, life-long physical activity, especially for younger youth.

The program was offered in a local park that had a community center and was adjacent to an elementary school providing a large grass play area and a private space for collecting data. Participants walked from school directly to the park, and the equipment was stored in a secure room on the school campus. The program ran twice a week from 3:00-4:00 pm, and at the conclusion of the hour the participants went to a YMCA homework assistance program in the community center that was offered daily. Thus, two problematic aspects of afterschool programs—transportation limitations and secure equipment storage—were alleviated by these collaborations.

The program was developed by the lead author, who worked with a team of five undergraduate Kinesiology students on curriculum development and implementation of the activities. The second author and two graduate students were responsible for data collection, organization, and analysis. The undergraduate students received three units of internship credit towards graduation, and participated in orientation sessions in understanding the qualities of developmentally appropriate games and physical activities for children. Students were trained to develop activities that use skill progressions, maximize engagement (with most of the children moving for most of the time), ensure a safe environment, focus on game- and sport-specific as well as lifetime activities, and provide variety with respect to equipment, skills, and objectives (Graham, 2001; NASPE, 2004).

The student leaders developed the lesson plans and submitted them in advance for feedback and approval from the first author based on the criteria indicated above. Students were encouraged to use valid, pre-existing curricula, such as the Coordinated Approach to Children's Health (CATCH; McKenzie et al., 2001) and the Sports, Play, and Active Recreation for Kids (SPARK; McKenzie, Sallis, Kolody, & Faucette, 1997; Sallis et al., 1997) programs, as well as activities provided on www.PEcentral.com and www.afterschoolpa.org. Games incorporated movement activities representing moderate (3-6 METs) or vigorous (>6 METs) intensity (Ainsworth et al., 2000). Age-appropriate variations of tag games, obstacle courses, pillow polo, traditional sports (soccer, basketball, etc.), jump rope, relays, and potato sack races (as general examples) were used, incorporating gross motor activities such as running, jumping, kicking, throwing, and dodging. On average, three major activities were planned per session, with children rotating in small groups of 10-12 (by age or skill level) at about 20 minutes per activity, with one group leader at each of the three stations. In addition to relatively small amounts of sport-specific equipment (i.e., soccer balls, footballs, pillow polo sticks), general equipment used in a variety of games (i.e., various sized and textured balls, cones, hoola hoops, bean bags, field markers, scarves) was purchased.

Measures and Procedures

Two types of measures were used to evaluate our research aims. *Program effectiveness* measures of pedometer step counts, activity time, and heart rate data were used to evaluate the extent to which the curriculum resulted in sufficient amounts of MVPA. Attendance rates were computed to evaluate physical activity dose received. *Outcome measures* were pre- and posttest data collected to measure changes in anthropometric and physiological markers in participants over the course of the intervention.

Program Effectiveness

Physical activity dose (number of steps, minutes). Physical activity was measured during each session by the Walk4Life™ dual function pedometer, which assesses step counts and cumulative activity time (in minutes and seconds). Pedometers were placed on participants at their right hip by program staff prior to instruction and collected and recorded at the conclusion of each one-hour session. Pedometer use has been found to be a valid and reliable estimate of physical activity in children (Beets, Patton, & Edwards, 2005; Rowe, Mahar, Raedeke, & Lore, 2004), and was chosen based on cost-effectiveness, low participant burden, and ease of data management.

Physical activity dose (intensity).

To ensure that participating youth were engaged in sufficient levels of moderate-vigorous physical activity, which is recommended to improve cardiovascular fitness in youth (Strong et al., 2005), heart rate (HR) was monitored in 9-10 randomly selected youth per meeting day on some meeting days throughout the delivery of the program. Once the youth arrived to the park, those youth were fitted with a heart rate transmitter and with the receiving wrist-watch, Polar E600 (Kempele, Finland). HR was recorded every minute immediately once the youth were fitted with the monitor and lasted until the session was over. After each session, HR readings were downloaded to a laptop computer for each child and for each session. HR readings for the child during a single session were defined as one HR observation. In the case of lost HR readings between minutes, an estimated HR reading for one minute was computed extrapolating from the previous and posterior readings. The highest HR recording obtained was 236 beats per min. This recording was in range with previously presented HR in youth (Baraldi et al., 1991) and thus was not discarded from the data set. For each observation the following measurements were obtained: monitored time (minutes), number of minutes in which the HR readings were > 130 beats/min, and mean HR for that observation (beats/min).

Outcome Measures

All outcome measurements were obtained in a private room inside the park's community center. Pre- and posttest measures were conducted by a pediatric exercise physiologist and two trained research assistants. Intra-rater reliability was evaluated for waist circumference, blood pressure, and body composition measurements. With the exception of the blood pressure estimates (r = 0.85), all pretest and posttest coefficients were ≥ .99.

Anthropometrics.

Participants were dressed in shorts or pants and t-shirts with no shoes. Heavy sweatshirts or jackets were removed before measurements were taken and pockets were emptied. Body mass was obtained in kilograms to the nearest 0.1 kg using a stand-up Detecto 349 balance beam scale (Brooklyn, NY). The scale was calibrated before testing sessions by using two 50 lb weights. Stature was measured to the nearest 0.1 cm using the height rod from the Detecto 349 balance beam scale (Brooklyn, NY). Both measurements were obtained following procedures described by the National Health and Nutrition Examination Survey (USDHHS, 1996). Body mass index was computed using body mass in kg divided by height in meters squared (BMI = kg/m^2).

Skinfolds and body fat percentage.

Triceps and subscapular skinfolds were measured in triplicate using Lange skinfold calipers (Beta Technology, Santa Cruz, CA) and following procedures described by the National Health and Nutrition Examination Survey (USDHHS, 1996). The sum of the skinfolds (SSF) was calculated from mean measurements of both skinfolds. Body fat percentage was estimated using the validated sex-age specific equations for white youth from Williams et al. (1992).

Waist circumference.
Waist circumference was measured to the nearest millimeter using a Gulik tape (Creative Health Products, Plymouth, MI) at just above the uppermost lateral border of the ilium, at the end of normal expiration following the same procedures as in the Third U. S. National Health and Nutrition Examination Survey (USDHHS 1996). The average of two consecutive measurements was considered the waist circumference value.

Resting blood pressure.
Blood pressure was measured in duplicate after 10 min of quiet sitting. Systolic and diastolic blood pressure measurements were obtained with a handheld anaeroid sphygmomanometer Model DS66 (Welch Allyn, Skaneateles Falls, NY) in duplicate with 5 min between each measurement.

Maximal aerobic capacity.
Participants completed the *Progressive Aerobic Cardiovascular Endurance Run* (PACER), a component of the FITNESSGRAM® youth fitness test (Cooper Institute, 2005) and a valid and reliable field-based test of cardiovascular endurance (Mahar, Welk, Rowe, Crotts, & McIver, 2006; Pitetti, Fernhall, & Figoni, 2002). The participant was instructed to run consecutive laps back and forth (on a grass surface) at a distance of 20-m as many times as possible at a pace that increases in intensity every minute. A cadence was played on a CD with a beep signaling the start of a lap, at which point the participant was required to cross the 20-m line, turn, and start the next lap at the sound of the subsequent beep. Each lap a student completed successfully was counted, and a sum of laps served as the final PACER score. The PACER was chosen because it is low cost, uses little equipment, and was presented as a game-like challenge to encourage children to exert maximal effort (Wiersma & Sherman, 2008). The PACER was completed at both the pretest and posttest.

Statistical Analyses
The statistical analyses were computed in several steps. First, pedometer and heart rate data were analyzed to provide an estimate of program efficacy in terms of physical activity dose. All HR observations (n = 68) were then compiled for the HR analyses. The mean duration for 68 HR observations was 45 ± 6 minutes. Each recorded HR for each participant during each session (one per minute) was used to calculate the following: (1) mean number of minutes per session for which participants' HR was > 130 beats/min, and (2) mean HR for that session (beats/min). The cut-off of HR > 130 beats/min was used to define MVPA based on a previous study that has used the same definition in youth of similar ages (Janz, 1994).

Second, for descriptive purposes, means and standard deviations were computed for all subjects for all outcome variables by sex. Then sex comparisons were made on these variables using independent samples t-tests. Sex- and age-adjusted body mass index percentiles were used to classify youth into normal weight (< 85th), at-risk for overweight (≥ 85th to < 95th), and overweight (≥ 95th) categories (CDC, 2000). Triceps percentiles were used to categorize youth based on subcutaneous adiposity (< 85th and ≥ 85th or percentile for age and sex) using NHANES 1999-2002 reference values (McDowell et al., 2005). Waist circumference percentiles (< 90th or ≥ 90th percentile for age and sex) were used to categorize youth based on levels of trunk adiposity (Li et al., 2006). These stratification procedures were done to provide sample characteristics that are indicators of childhood obesity.

Third, pre-post intervention measurements of anthropometrics, blood pressure, and cardiovascular fitness were compared using dependent t-tests. Pre-and postdata were analyzed for participants whose attendance in the program was greater than 65%. No analyses were done by sex because of the small sample size. The cutoff for statistical significance was $p < 0.05$ and analyses were conducted using the Statistical Package for Social Sciences (SPSS) for Windows version 14.0 (Chicago, IL).

Results

Program Reach

Of the 44 participating youth in the YMCA afterschool program carried out in the community center adjacent to the park, 39 youth participated in Active Kids. From a total of 30 possible meetings, the program was delivered 23 times; non-meeting days included school holidays (4 days) and park construction (3 days). Of the 39 children enrolled in the program, 20 children attended at least 65% of the sessions; the following results are limited to 18 of those children in whom complete data were available.

Program Effectiveness: Physical Activity Dose (Duration and Intensity)

Average daily group steps during the hour program ranged from 2,043 (*SD* = 491) on the least active day to 3,370 (*SD* = 971) on the most active day, while average cumulative time moving ranged from 21.43 min (*SD* = 3.52) to 35.46 min (*SD* = 9.73). As expected, the range of steps and time of movement varied considerably from child to child; on a single day, for example, the number of steps ranged from 762 to 5,113, while cumulative time in movement ranged from 13.52 min to 53.51 min. Average number of daily steps across the 15-week program ranged from 1,828 per session for the least active participant to 3,728 steps per session for the most active participant. Average cumulative time per child ranged from 19.59 min per session to 37.10 min per session. We obtained HR data for 68 sessions throughout intervention period, with mean monitoring time of 45 ± 6 minutes. In this data we observed a mean of 29 ± 10 minutes with a HR > 130 beats per minute, which means that approximately 64% of the time the participants achieved the target HR. The mean HR throughout those 68 observations was 145 ± 14 beats per minute.

Table 2

Change of body mass index, waist circumference, and triceps skinfold, by sex

Variable	Girls n=11 (%)			Boys n=6 (%)		
	Pre	Post	%Δ	Pre	Post	%Δ
BMI Percentile						
<85th	7 (63.6%)	8 (72.7%)	+9.1%	3(50.0%)	4(66.7%)	+16.7%
≥85th - < 95th	2(18.2%)	0(0.0%)	-18.2%	2(33.3%)	1(16.7%)	-16.6%
≥95th	2(18.2%)	3(27.3%)	+9.1%	1(16.7%)	1(16.7%)	0.0%
WC Percentile						
<90th	9(81.8%)	9(81.8%)	0.0%	5(83.3%)	6(100%)	+12.7%
≥90th	2(18.2%)	2(18.2%)	0.0%	1(16.7%)	0(0.0%)	-12.7%
Triceps Skinfold Percentile						
<85th	9(81.8%)	9(81.8%)	0.0%	5(83.3%)	5(83.3%)	0.0%
≥85th	2(18.2%)	2(18.2%)	0.0%	1(16.7%)	1(16.7%)	0.0%

Note: Δ = change; WC = waist circumference

Outcome Measures

There were four children at baseline classified as being at risk for overweight, and 3 classified as having obesity. Table 2 presents that one boy went from being in the at-risk for overweight to the normal weight category for BMI; for girls, one went from at-risk for overweight to the normal weight and another one went from the at-risk for overweight to overweight categories. With respect to waist circumference, no changes in the categories were found for girls, while one boy went from presenting trunk obesity (WC > 90th percentile) to no obesity. Youth remained in the same category for triceps skinfold throughout the intervention.

For those children with attendance rates at or above 65% of the sessions (*n* = 18), the program led to a significant increase in cardiovascular endurance (from 20.9 ± 17.1 to 27.2 ± 15.9 laps; *p* =.013), as measured by the PACER, and a nonsignificant decrease in waist circumference

(65.8 ± 12.0 to 65.1 ± 11.8 cm; p = .086). BMI increased significantly (18.6 ± 4.0 to 19.0 ± 4.2; p = .014), as did body mass (32.2 ± 12.6 to 33.1 ± 13.2 kg.; p = .018). No significant changes were found in triceps (14.5 ± 6.9 to 14.8 ± 8.6; p = .681) or subscapular (11.4 ± 7.7 to 11.9 ± 8.7; p = .921) skinfold measures, percent of body fat (24.5 ± 7.6 vs. 24.1 ± 7.0; p = 0.454) or in systolic (99.6 ± 12.5 mmHg to 98.3 ± 10.8, p = .683) or diastolic (59.9 ± 9.1 to 60.4 ± 11.5, p = .893) blood pressure.

Discussion

The *Active Kids* program was designed as a games-based afterschool intervention aimed at providing physical activity opportunities for Hispanic youth in agreement with PA guidelines (Beets et al. 2010). It is important to note that while the program was originally marketed to overweight children, 55% of the participants were of normal weight and had normal blood pressure. Our goal, therefore, was to offer physical activity as a means of preventing future increases in body mass, blood pressure, waist circumference, or percent of body fat (Menschik, Ahmed, Alexander, & Blum, 2008; Moore et al., 2003), a policy strongly supported by most public health agencies.

Reach, effectiveness, PA activities goals accomplishments

One goal of the program was to ensure that participating youth were physically active at least 20 minutes each session with a HR > 130 beats/min (Janz, 1994). Recommendations to improve cardiovascular fitness levels in youth require at least 20 minutes of activity at a heart rate range between the 40-60% of heart rate reserve 3 times per week. In addition, guidelines for physical activity in afterschool programs in CA range from 30 to 60 minutes of MVPA per day to 30 minutes of MVPA per 3-hour block of afterschool activity (Beets et al., 2010; Beets, Huberty, & Beighle, 2012). Pedometer data (in both step amounts and cumulative time) and heart rate data indicated that the children met these requirements on the days the program was offered. On one side these data confirmed the notion that a games-based curriculum (as opposed to a traditional exercise program) may lead to improved cardiovascular fitness and prevent inactivity-related disease. On the other side, the data show that with planning it is possible to provide physical activity opportunities during afterschool programs.

Pre-post measurements

Body mass and body mass index both increased throughout the duration of the intervention. Even though there were overall increases in body mass during the intervention, one out of eleven girls and one out of ten boys moved from being at-risk for overweight to the normal weight category, according to BMI percentiles, and one of the boys moved from the at-risk to the normal category for waist circumference. Growth and maturation for children this age is normal and one may expect natural increases in body mass throughout childhood. Given that 56% of the participants were normal weight, and that body mass increases even in children with high activity levels (Moore et al., 2003), this result appears reasonable and has been observed in other park-based interventions (Bush et al., 2007). Moreover, promoting physical activity as a means of maintaining levels of body mass is more effective than attempting to promote body mass loss in youth (Menschik et al., 2008).

Most of the youth in the present study had normal blood pressure values (< 90^{th} percentile for age, sex and height) at the beginning of the program (National High Blood Pressure Education Program Working Group, 2004). Therefore, it is no surprise that there were no changes in blood pressure values because of the participation in the program (Strong et al., 2005).

Youth who participated in the *Active Kids* program improved their levels of cardiovascular endurance by 35%. Increased aerobic endurance is important in that it has been associated with reduced insulin resistance and improved cardiovascular profile in youth independent of weight status (Eisenmann et al., 2005; Rubin et al., 2008). Moreover, improvements in endurance may lead to increases in motivation to be physically active and to increases in self-worth (Wiersma & Sherman, 2008).

Study Limitations

Several limitations of this study exist. Only approximately half of the current sample attended the program at least 65% of the time, limiting the number of children included in the analyses and thus also limiting statistical power. Anderson-Butcher (2005) reported that regular attendance in structured afterschool programs is as low as 25% of those enrolled, thus the program appeared to face at least some of the barriers of other afterschool efforts. It is possible that participants were different from other children in the neighborhood, as we lack data on other children not participating in the study and reduces the generalizability of the results.

Due to restrictions in park availability, the intervention was offered only twice a week, which is less than the 3-5 days of physical activity recommended for children by others (USDHHS, 2008; Strong et al., 2005) as well as for afterschool programming (Beets et al., 2012). Despite this limitation, the program led to increases in cardiovascular endurance and no change in waist circumference or skinfolds, suggesting no gain in fat mass. However, the lack of a comparison or control group limits the validity of our results in relationship to other factors we could not account for but that could have influenced these results.

Finally, although the HR and pedometer data were collected following recommendations for these assessment tools, all participants wore pedometers but only a group of children, randomly selected, wore HR monitors each day. Therefore, it should be noted that it is possible that on the days in which participants wore the HR monitor they exercised more vigorously because of wearing the monitor.

Study Implications

With the continued national efforts to promote physical activity in youth (USDDS, 2010), determining which physical activities opportunities may lead to positive changes in children's health is a must. Interventions using a combination of exercise and play have reported improvement in different fitness parameters (Colchico, Zybert, & Basch, 2000) as well as metabolic parameters (Ferguson et al. 1999). The approach used in the current study, characterized by noncompetitive, creative, and fundamental movement patterns, appears to be an effective alternative to existing traditionally structured or sport-specific exercises, especially for children who have little exposure to traditional exercise or sport settings. Future interventions may consider a parental or family component addressing principles related to healthy nutrition, disease prevention, and the importance of regular, developmentally appropriate physical activity as in agreement with Healthy People 2020 objectives.

In conclusion, partnerships among universities, local schools, and communities, may be effective in providing physical activity opportunities for underserved youth. Moreover, a games-based approach to fitness, offered twice a week, appears sufficient to provide MVPA consistent with current recommendations for children to improve fitness (Strong et al. 2005) as well as PA benchmarks during afterschool (Beets et al. 2010).

Note: This journal article/publication was supported by grant/cooperative agreement number 1 RO1 DP000209-01 from the CDC. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC.

Acknowledgements: The authors would like to thank Alejandro Espinoza, Todd Naffziger, Eilea Selesky, Matt Dersam, Tiffany Lin, and Jackie Gogan for their creative development or modification and implementation of the physical activity curriculum, and Melissa Wigginton and Andy Shin for their assistance with data collection.

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