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From Policy to Practice: Strategies to Meet Physical Activity Standards in YMCA Afterschool Programs

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Abstract

Background—In 2011, the U.S. YMCA adopted activity standards recommending that afterschool programs (ASPs) ensure all children engage in a minimum of 30 minutes of moderate to vigorous physical activity (MVPA) daily during the ASP. ASPs decide how to accomplish this standard, for which few effective strategies exist.

Purpose—To evaluate strategies designed to help ASPs meet the MVPA standard.

Design—Single group intervention with pretest and three follow-up measures repeated-cross-sectional design with a subsample cohort.

Setting/participants—Four large-scale YMCA ASPs, serving approximately 500 children each day.

Intervention—Community-based participatory development of strategies focused on modification of program schedules, professional development training, and weekly checklists to evaluate activity opportunities.

Main outcome measures—Accelerometry-derived MVPA classified as meet or fail-to-meet the 30min/d MVPA standard collected over a minimum of four nonconsecutive days at baseline (fall 2011) and 3 follow-up assessments (spring 2011, fall 2012, spring 2013). Random intercept logistic regression models evaluated the probability of meeting the standard for boys and girls, separately (analyzed summer 2013).

Results—A total of 895 children (aged 5–12 years, 48.4% girls) representing 3,654 daily measures were collected across the four assessments. The percentage of girls and boys meeting the MVPA standard at baseline was 13.3% and 28.0%, respectively. By spring 2013 this increased to 29.3% and 49.6%. These changes represented an increase in the odds of meeting the 30min MVPA/d standard by 1.5 (95CI 1.1 to 2.0) and 2.4 (95CI 1.2 to 4.8) for girls and boys, respectively.

Conclusions—The strategies developed herein represent an effective approach to enhancing current practice within YMCA ASPs to achieve existing MVPA standards. Additional work is

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necessary to identify the cost associated with using the strategies, as well as to evaluate the scalability of the strategies in a larger sample of ASPs.

Introduction

Across the United States, afterschool programs (ASPs) have been called upon to contribute to solutions for childhood physical inactivity.^{1–3} A major focus in this endeavor has been the creation of policies and standards specifically targeting the amount of physical activity (PA) children should accumulate while attending an afterschool program. Existing policies/standards represent everything from locally developed program expectations, state legislation, to nationally endorsed guidelines.^{1,4} In November 2011, the nation's largest provider of ASPs with programs in over 10,000 communities, the U.S. YMCA, adopted PA standards for all its ASPs specifying that all children engage in a minimum of 30 minutes/day of moderate to vigorous PA (MVPA) while attending an ASP. The ability for ASPs to achieve this goal successfully remains unclear.

To address this achievement gap, numerous PA interventions have been developed and evaluated in the ASP setting, with limited effectiveness at increasing MVPA within ASPs⁴; other strategies have been developed yet have not undergone evaluation to determine their impact on children's PA and meeting the MVPA standards.⁵ Importantly, none of the interventions conducted to date have evaluated outcomes based on policies or standards for MVPA within ASPs. The objective of this study was to describe the impact of strategies developed from a community collaborative partnership between YMCA ASPs and a local university on the proportion of children meeting MVPA standards for ASPs.

Methods

Setting and Participants

Four large-scale YMCA locations in the Midlands region of South Carolina participated in this study. These YMCA locations were selected because of their joint organizational structure (all were overseen by the same CEO), agreement to take part in the collaborative, and existing relationship with the local university. Baseline data collection took place August–September 2011, with three follow-up measures taking place in spring 2012 (April–May), fall 2012 (November), and finally in spring 2013 (April–May). Adoption of the Physical Activity Standards and implementation of the developed strategies began January 2012. All children attending the ASPs were invited to participate in this study. Exclusion criterion for participation was the inability to be active without an assistive device (e.g., wheelchair). Each child's measured height (cm) and weight (lbs), age (years), gender, and self-identified race/ethnicity were collected at all time points. All protocols were approved by the University's Institutional Review Board.

Each YMCA location provided an ASP for children aged 5–12 years, Monday through Friday, each day of the school year. The programs ranged in start time from 2:30pm to 3:30pm and ended between 6:00pm and 6:30pm. All programs provided the same scheduled activities including snack, homework/academic time, enrichment, and indoor/outdoor opportunities for children to be physically active. Across the programs, approximately 450 to 550 children were enrolled daily, with enrollment at each location ranging from 60 to 195 children attending daily. All locations had comparable indoor (e.g., gyms) and outdoor (e.g., green fields) spaces for children to be active. Staff-to-student ratio across the sites was 1:10 to 1:12.

Intervention: Community-Based Participatory Collaborative

The working collaborative was grounded in the principles of community-based participatory research.⁶ Briefly, the U.S. YMCA adopted Healthy Eating and Physical Activity Standards in fall 2011. The local YMCAs participating in this study initiated contact with a local university with the intention of developing strategies to assist them in meeting the MVPA standard. The collaborative consisted of YMCA branch executive directors, ASP program leaders, ASP frontline staff, and university personnel. The collaborative met monthly from October 2011 to April 2013 to identify effective and ineffective program components. During these two-hour meetings, ongoing onsite observations conducted jointly by ASP program leaders and university personnel, as well as the outcomes from the baseline evaluation, were discussed and reviewed. Components were mapped onto an existing systems framework for translating childhood obesity policies into practice in out-of-school-time programs.⁴ Program components deemed most modifiable, with a realistic input of resources (e.g., staff and program time) and monetary investment, were identified and targeted for modification. The primary goal of the working collaborative was to develop a comprehensive and coordinated approach to achieving MVPA goals and to identify changes that could be made to the ASP system that would lead to long-term sustainability and integration into routine practice.^{7–9} Over the 17 months that they met, the working collaborative developed a set of strategies—targeted at YMCA branch executive directors, ASP program leaders, and frontline staff—to maximize the amount of MVPA children accumulate during planned PA opportunities. These strategies are summarized below. A timeline of major events over the two-year study is presented in Figure 1.

Physical Activity Strategies

Professional Development Training—The PA strategies for ASP leaders and frontline staff involved professional development trainings and corresponding onsite booster sessions. The training lasted a single day (~6 hrs) and utilized the 5 Ms (mission, mode, manage, monitor, maximize), an evidence-based training model for promoting activity in out-of-school-time programs.¹⁰ Embedded within the training were the LET US Play elements for optimizing activity during scheduled activity time. LET US Play refers to lines, elimination, team size, uninvolved staff/kids, and space, equipment, and rules: elements that were identified as primary barriers to maximizing children's PA during already scheduled PA opportunities. The trainings focused on the identification of the LET US Play elements in games frequently played at the ASPs and their subsequent modification employing a variety of strategies, such as using small-sided games (i.e., no more than 5-v-5), modifying rules, and removing both lines and elimination from activities.

Standards Accountability Checklist: Seeing the Standards—The checklist summarized the elements from the 5 M's and LET US Play trainings. Checklists were completed weekly by the ASP program leader and reviewed, jointly, with university personnel. In addition, onsite trainings were held for branch executive directors and ASP program leaders, during which they shadowed university personnel and observed program-related activities to identify areas consistent/inconsistent with meeting the standards. The onsite trainings were an iterative process whereby suggestions regarding program involvements were discussed, implemented, evaluated, and refined. This process occurred three times per semester (16 wks, total of 36 boosters) from January 2012 through April 2013.

Detailed Schedules—Existing schedules indicated only the time allocated (e.g., 4:30 to 5:30 pm) and general activity or location (e.g., field games) without clear indication of specific activity, equipment, and staff were needed. Workshops were developed to assist ASP program leaders to create detailed daily schedules by clearly indicating the activity/

game, the equipment needed, rules, and corresponding modifications where needed, and specifying staffers to lead the activities.

Training Cost Delivery—Delivery costs associated with implementing the PA strategies were compiled over the duration of the project. This included all costs incurred in delivery, which included the LET US Play trainer cost (hourly wage), transportation costs of training personnel (e.g., travel to ASPs), booster session costs (e.g., hourly wages for ASP employees), and costs associated with providing ongoing technical support (e.g., travel for booster/trainings visits, time allocated to scheduling booster/trainings). Costs related to the development and evaluation of the strategies were excluded in order to capture the true cost of replicating the strategies in other ASPs. Costs were estimated to reflect two scenarios: (1) additional cost per 16-week (e.g., Jan–May) semester across all four ASPs, and (2) additional increase in weekly enrollment fee per child.

Physical Activity Measurement

Physical activity was collected using ActiGraph accelerometers (Shalimar, FL) on a minimum of four nonconsecutive days at each measurement occasion. The epoch was set at five-second intervals¹¹ to improve the ability to capture the transitory PA patterns of children.^{12,13} When arriving at the programs, each child was fitted with an accelerometer and the arrival time recorded (monitor time-on). Children were allowed to participate in their normal ASP activities. Research staff continuously monitored the entire ASP for compliance in wearing the accelerometers. Before a child departed from a program, research staff removed the accelerometer and recorded the time of departure (monitor time-off). This procedure was performed throughout the duration of the study. Physical activity data were collected Mondays through Thursdays. Widely used cutpoint thresholds for MVPA¹⁴ and sedentary behavior¹⁵ were used. A valid day of accelerometer data was total wear time (time-off minus time-on) ≥ 60 minutes.^{16–18}

Statistical Analysis

Analyses were conducted only on children with a minimum of one valid wear day.^{16–18} Descriptive means, standard deviations, and percentages (for dichotomous variables) were computed separately for boys' and girls' demographic characteristics and for PA and sedentary behaviors. To evaluate the impact of the strategies on the 30min MVPA/day standard (study's primary outcome), the minutes all children across the four assessments spent in MVPA were dichotomized to represent those children who achieved (i.e., ≥30min MVPA/day) and those that failed to achieve (i.e., <30min MVPA/day) the standard. Random effects logit models, with days measured nested within children nested within ASPs, were estimated using the dichotomized 30min MVPA/day variable as the dependent variable. Measurement assessment time as well as the total amount of time a child attended were included in the model. Logit models were estimated separately for girls and boys. Age (years), race, and BMI age–sex specific percentile categories were entered into the models and retained as covariates if they contributed significantly ($P < .05$) to the models.

For the secondary outcomes of minutes accumulated per day of MVPA and sedentary behavior, random effects general linear models were estimated with days measured nested within children nested within ASPs. For these models, the total amount of time a child attended daily was controlled. In all models, both linear and nonlinear terms for measurement occasion were evaluated to model change over time. Models were also separately estimated for boys and girls who were present at all four measurement occasions. Analyses were performed using Stata (v.12.0, College Station TX).

Results

Daily measures numbering 3654 representing a total of 895 children (average 7.5yrs, range 5–12yrs, 48.4% girls) who met the inclusion criteria were collected across the four assessments. The number of children enrolled across the four YMCA ASPs, and of these the number of children wearing an accelerometer and those meeting the inclusion criteria, are presented in Table 1. Across the two-year study, 89.8% of the children enrolled wore an accelerometer, and, of these, 94.0% attended the program for 60 minutes or more on any day of data collection. Of the children measured and meeting the inclusion criteria, 549 or 61% were measured during at least two assessment periods. Across the four measurement periods, the majority of the children self-identified as White non-Hispanic (58%) or African American (41%).

Descriptive means and standard deviations for PA, sedentary time, and time in attendance are presented in Table 2. At baseline, girls and boys engaged in 17.5 and 22.7 minutes/day of MVPA and 58.0 and 52.3 minutes/day of sedentary behavior while attending an ASP, respectively. This translated into 13.3% and 28% of girls and boys meeting the 30min MVPA/day standard. By spring 2013 (third and final follow-up assessment), MVPA increased to 21.6 and 30.6 minutes/day for girls and boys, respectively, while minutes/day spent sedentary decreased to 49.1 and 44.1, respectively. This represented an increase to 29.3% of girls and 49.6% of boys meeting the 30min MVPA/day standard by the end of the intervention. Estimates from the random effects logit models, controlling for time in attendance and accounting for the nonlinear change over time, indicated the odds of meeting the 30min MVPA/day standard increased to 1.5 (95CI 1.1 to 2.0) and 2.4 (95CI 1.2 to 4.8) for girls and boys, respectively, by spring 2013. Model estimates of changes in minutes of MVPA per day and minutes spent sedentary per day, controlling for time in attendance and accounting for nonlinear change, are presented in Figure 2. Over the four measurement occasions, minutes of MVPA/day increased by 2.7 (95CI 0.6 to 4.8) and 4.3 (95CI 2.0 to 6.7), while minutes/day spent sedentary decreased by –7.5 (95CI –8.0 to –1.1) and –8.4 (95CI –11.9 to –4.9) for girls and boys, respectively.

A total of 79 boys and 76 girls were present and met the inclusion criteria across all four measurement occasions. For boys, average minutes of MVPA/day were 24.1, 28.3, 30.2, and 29.7, while girls average minutes of MVPA/day were 18.5, 19.9, 21.3, and 22.7, from fall 2011 to spring 2013, respectively. Both increases were statistically significant. This translated into 32%, 44.8%, 51.1%, and 50.7% and 14.5%, 18.5%, 22.6%, and 26.6% of boys and girls meeting the MVPA standard from fall 2011 to spring 2013, respectively. Neither age, race, nor age–sex-specific BMI percentiles were retained in any model. The total delivery cost of the strategies was \$10,833.00 (see Table 3). This translated into approximately \$3,611.00 per 16wk semester (e.g., spring 2012 Jan–May) for all four ASPs (\$902.75 per ASP per 16wks). Based on total enrollment numbers across the 4 ASPs (see Table 1), passing this cost along to parents in the form of increased weekly enrollment fees would result in an increase of \$0.47 per child per week each semester.

Discussion

Nationally, YMCA ASPs have been called upon to address childhood obesity through the adoption and successful achievement of PA standards. While important, there are limited empirically supported strategies ASPs can use to meet the 30min MVPA/day standard. This study specifically addressed this gap between policy and practice by creating PA strategies collectively developed by YMCA and university personnel to target modifiable elements in the ASP that limited the PA of children. By the end of the two-year evaluation, 1 in 3 girls and 1 in 2 boys met the 30min MVPA/day standard. This suggests that changes to the ASP

environment described herein can lead to meaningful increases in the proportion of children accumulating at minimum half of their daily recommended 60 minutes of MVPA/day.

Few PA interventions have measured children's PA via accelerometry within the ASP setting. Of these, limited to no changes in MVPA have been reported. For example, two studies have utilized pre-existing commercialized PA curricula, CATCH Kids Club¹⁹ and SPARK.²⁰ In these, ASPs using the SPARK curricula had similar MVPA levels compared to routine practice,²⁰ whereas ASPs using the CATCH Kids Club curricula resulted in an increase of ~2 minutes per day in the treatment group.¹⁹ Another study²¹ focused on the adoption of environmental standards for PA and education materials found an increase of ~10.5 minutes of MVPA for the entire day (includes all MVPA in- and out-side the ASP). Other evaluations of commercialized PA curricula using direct observation²² or self-report^{23, 24} to measure children's activity levels have reported similar findings to those using accelerometry. Evidence suggests ASP frontline staff utilized only a small portion of the curricula materials, lacked familiarity with the games, and received insufficient training.²² The current study addressed these issues by collaboratively developing a training model that capitalized on existing games and activities routinely played in the ASPs and taught staff skills to modify them to maximize activity levels. To increase accountability with the PA policies, ASP licensing should include PA goals, like those adopted by the U.S. YMCA, in addition to ensuring ongoing quality professional development training and support are provided and received.

An important, and unexpected, finding in this study was the sustained increase in MVPA even in the event of substantial turnover at the ASP leader position (i.e., the individual directly responsible for daily ASP programming). Over the two-year intervention, 16 different ASP leaders were responsible for the ASPs. Additionally, the childcare director for the four ASPs was replaced, as well as three branch executive directors (i.e., individuals responsible for daily operations at the YMCA facilities). These changes do not include the turnover of frontline staff, which averaged, 30–50% each August. Despite the high turnover, the strategies put into place created an ASP environment resilient to the revolving door of staffing at any level and suggests these organizational changes are an important step in achieving PA standards in ASPs. Other ASP studies have noted that staff turnover is a major barrier to implementing PA program changes.²⁵ One of the ways this was addressed in the current study was to embed the training into the already existing day-long August and January staff orientation/trainings. Likewise, the booster sessions and weekly checklists allowed for ongoing emphasis of skills developed during the trainings.

The strengths of this study are the large number of children measured within and across each measurement assessment, the development of strategies collaboratively by YMCA and university personnel, and the use of accelerometry to quantify MVPA in relation to clearly set PA standards: 30 minutes of MVPA per day. Additionally, the costs associated with the trainings and booster sessions resulted in minimal increases in weekly enrollment fees, if ASPs were to pass along the cost to parents and children. However, this study lacked a comparison/control group, and therefore it cannot be concluded that these changes would have occurred in the absence of the implementation of the strategies. Yet, the magnitude of the change in MVPA observed, and its comparison to that of prior studies,^{19–21} suggest that the strategies the reason for success. Finally, not all of the children met the 30min MVPA goal. Additional work on refining the PA strategies described herein are required to improve overall MVPA and target girls' MVPA through innovative programming (e.g., girls-only activity time). Moreover, knowing “all children” meeting the MVPA goal is an unlikely expectation. Conversations regarding the appropriateness of the 30min MVPA goal are needed, with a focus on rewording the policy to indicate a more feasible goal, such as three of four children accumulate 30min MVPA daily.

In conclusion, this study demonstrated that substantial and sustainable changes in children's MVPA can be achieved by incorporating the strategies developed and evaluated herein. These strategies also have the potential to be scaled and to be readily adopted and implemented by YMCAs and other ASPs across the nation. Future studies need to evaluate the strategies using a more rigorous experimental design.

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Abbreviations: PA = Physical Activity

Figure 1.
Intervention timeline and major events

Figure 2.

Model derived estimates of average minutes spent in moderate-to-vigorous physical activity while attending an afterschool program and the proportion of girls and boys, separately, meeting the 30 minutes of moderate-to-vigorous physical activity each day

Note: Estimates adjusted for total time in attendance. Error bars represent one standard deviation.

Table 1

Number of children enrolled and participating in the physical activity assessments during the two-year study

	Fall 2011		Spring 2012		Fall 2012		Spring 2013	
	N		N		N		N	
Total children enrolled in afterschool program	461		541		459		483	
Children with a minimum of one day of accelerometer wear ^a	411	89.2%	468	86.5%	422	91.9%	445	92.1%
Children with a minimum of one day of accelerometer wear attending the program for at least 60 minutes ^b	390	94.9%	442	94.4%	391	92.7%	418	93.9%
Average number of days children wore accelerometers while attending the program for at least 60 minutes		2.1		2.1		2.2		2.6

^a Represents the total number of unique children that had a monitor fitted to their waist on at least one day (e.g., Fall 2011, N = 411).

^b Represents children that had a monitor fitted to their waist who remained in the program for at least 60 minutes (e.g., of the 411, 390 stayed 60 minutes or longer).

Table 2

	Girls						Boys									
	Fall 2011		Spring 2012		Fall 2012		Spring 2013		Fall 2011		Spring 2012		Fall 2012		Spring 2013	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total # Children	186		201		175		201		204		241		216		217	
Age (yrs)	7.6	±1.7	7.5	±1.8	7.6	±1.6	7.4	±1.6	7.4	±1.7	7.6	±1.8	7.6	±1.6	7.5	±1.5
Physical Activity (min/d) ^a																
Sedentary	58.0	±23.8	55.3	±23.4	52.7	±19.3	49.1	±19.9	52.3	±21.3	46.0	±21.5	43.8	±22.2	44.1	±22.6
Light	38.5	±15.8	45.9	±17.4	41.3	±15.1	42.9	±15.5	40.7	±15.2	47.0	±19.4	42.4	±15.2	44.7	±17.1
Moderate	9.7	±5.2	11.3	±5.9	11.1	±5.5	11.2	±5.5	12.2	±5.9	14.6	±7.4	14.1	±6.6	15.2	±7.9
Vigorous	7.8	±5.7	10.4	±6.5	10.4	±6.6	10.4	±6.3	10.5	±6.7	13.4	±9.3	13.9	±7.8	15.4	±9.0
Moderate to Vigorous Physical Activity (MVPA)	17.5	±10.1	21.7	±11.5	21.5	±11.2	21.6	±10.9	22.7	±11.6	28.0	±14.8	28.0	±13.3	30.6	±15.8
Total Time Attendance (min/d) ^c	113.8	±36.1	122.7	±36.3	115.5	±33.1	113.5	±33.4	115.7	±32.1	120.7	±36.7	113.4	±35.3	118.4	±37.5
Percentage of Children meeting MVPA Standard ^b	13.3%		22.9%		23.3%		29.3%		28.0%		43.1%		42.5%		49.6%	

⁷Physical activity estimated via accelerometry using Evenson cutpoints. Only children attending a minimum of 60 minutes are included. Estimates represent average minutes of activity while attending the afterschool programs. Estimates are not adjusted for total time in attendance

² The percentage of children meeting the 30 minutes of moderate-to-vigorous physical activity standard

Total time in attendance represents the total amount of time children wore the accelerometers

Table 3

Estimated cost of physical activity professional development training and booster sessions across 4 afterschool programs (ASPs)

Activity	Number/Cost	Description
Semester Booster Training Sessions Number of Boosters	36	3 boosters per ASP across 3 semesters. Booster consisted of program walkthrough by LET US Play Trainer (avg. 3hrs) followed by 1hr session with ASP leader and staff
YMCA Staff and Leader	\$3,420.00	Average number of staff attending booster was 8 (@ \$10.00/hr), 1 ASP Site Leader (@ \$15.00/hr), length of each booster was 1hr
LET US Play Trainer	\$4,176.00	108hrs of booster walkthrough time plus 36hrs meeting with ASP leader and staff @ \$29.00 per hr (includes fringe)
Travel	\$1,902.60	Includes round-trip mileage reimbursement @ \$0.55/mile and travel time (estimated via Google Maps)
ASP Annual Professional Development Trainings Number of Trainings	3	3 semester trainings (Jan 2012, Aug 2012, Jan 2013) @ 6hrs each
LET US Play Trainer	\$522.00	\$29.00 per hour (includes fringe)
LET US Play Support Staffer	\$180.00	\$10.00 per hour
Travel	\$110.40	Includes round-trip mileage reimbursement @ \$0.55/mile and travel time (estimated via Google Maps)
Total Training/Booster Cost	\$10,833.00	Cost estimate does not include ASP leader or staff hourly wage during annual trainings. Annual trainings were already scheduled as part of routine professional development in these programs. The LET US Play trainings were one of several sessions taking place during the professional development – no additional time was added to the time allocated to the annual professional development training.
Per Semester (16 weeks)	\$3,611.00	3 semesters
Average increase in semester enrollment fee per child	\$7.46	Based on enrollment numbers in all 4 ASPs across the 4 measurement time periods of 461, 541, 459, and 483 children and a 16 week semester.
Average increase in weekly enrollment fee per child	\$0.47	Based on a 5 day (Mon-Fri) week – Enrollment fees per child were \$40.00 YMCA members to \$60.00 for non-YMCA members per week