INTERVENTION TABLE 15

Child Care Physical Activity Policies

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
United States						
Barbeau, Johnson (2007) Georgia	After school physical activity 5 days per week for 10 months including 80 minutes of physical activity (25 minutes skill development, 35 minutes moderate-to-vigorous physical activity, 20 minutes toning and stretching) ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* 1. Free healthy snack provided *Complex:* 1. Parents and children attended information sessions. 2. Prizes given weekly for good behavior and attitude	***DESIGN:*** Randomized trial ***DURATION:*** 10 months ***SAMPLE SIZE:*** 201 Black, female students (randomized after pre-testing: 118 intervention, 83 control) in 7 elementary schools; 278 provided complete baseline with 201 providing follow-up ***PRIMARY OUTCOME:*** Overweight/obesity and moderate-to-vigorous physical activity (MVPA) ***MEASURES:*** 1. Anthropometric data: Height and weight (body mass index [BMI]), waist circumference, subscapular, triceps, and suprailiac skinfolds 2. Dual Energy X-Ray Absorptiometry (total body composition) 3. Cardiovascular fitness treadmill test (oxygen consumption and heart-rate) 4. 7-day recall for physical activity (activities over past 7 days, sleep, intensity of physical activities) 5. Tanner staging (sexual maturation/stage in puberty) ***DATA COLLECTION:*** Baseline data for all measures were collected beginning in late July and early August and ending in mid-fall, and follow-up data were collected after the 10 month intervention. Total body composition (total body fat, fat-free soft tissue, bone mineral content) was obtained using DXA, a magnetic resonance imaging scan that measured visceral adipose tissue and subcutaneous abdominal adipose tissue. Two indices of fitness were tested, maximal oxygen consumption and oxygen consumption at a heart rate (HR) of 170 beats per minute (bpm). Values from the hard and very hard categories of physical activity were summed to derive an index of vigorous physical activity. ***LIMITATIONS:*** Because children were growing, the capability to show changes like waist circumference may have decreased	African American, Females, 8-12 years old (target sample) ***ELIGIBILITY:*** All Black girls in grades 3 through 5, weighing <300 lbs, not taking any medication affecting body composition or fat distribution, with the ability to participate in regular physical activity were eligible. Students and their parents signed informed consent/ assent forms. ***EXPOSURE/ PARTICIPATION:*** 278 children attended after-school sessions	***LEAD AGENCY:*** Researchers were from the Georgia Prevention Institute at the Medical College of Georgia. ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** Teachers received formal training before the start of the intervention. The intervention was implemented by teachers and teaching assistants and at least one researcher attended all sessions. Each school was given a manual of procedures that included all the information necessary to implement the intervention, including a large number of potential activities. The control group received no intervention. ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** 1. Intervention manual 2. Weekly prizes 3. Healthy snacks 4. Teachers and assistants to lead activities ***FUNDING:*** National Institutes of Health ***STRATEGIES:*** Not reported	***OVERWEIGHT/OBESITY:*** 1. Compared with the control group, the intervention group had a relative decrease in adiposity, including %BF (body fat)(Δ= -2.01, 95% CI:-2.98, -1.04) and a relative increase in BMC (bone mineral content) (Δ=0.044, 95% CI; 0.024, 0.064), and BMD (bone mineral density) (Δ=0.020, 95% CI: .012, 0.027), p<0.0001 for all variables. 2. Increased participation was associated with greater decreases in %BF (partial r^2=0.03) and BMI (partial r^2=0.05) and greater increases in BMD (partial r^2=0.03). 3. Higher heart rate was associated with greater decreases in %BF (partial r^2=0.11) and fat mass (FM) (partial r^2=0.07) and greater increases in BMD (partial r^2=0.04) and fat free soft tissue (FFST) (partial r^2=0.09). 4. After accounting for heart rate and attendance, higher heart rates were associated with greater decreases in %BF (β=-0.225, p<0.01), while attendance was only marginally associated (β=-0.076, p=0.07), this was also seen with BMD, where higher heart rates were associated with greater increases in BMD (β=0.001, p<0.05) and attendance was only marginally associated (β<0.001, p=0.09). 5. The intervention group had smaller increases in subscapular (p<0.01), suprailiac (p<0.05), and triceps (p<0.05) skinfolds than the control group. 6. Visceral adipose tissue of the intervention group increased substantially less than the control group (Δ=-14.6, 95% CI: -24.2, -5.1, p=0.003). ***PHYSICAL ACTIVITY:*** 7. The intervention group had a relative increase in moderate physical activity (Δ=0.21, 95% CI: 0.07, 0.34, p=0.004), vigorous physical activity (Δ= 0.15, 95% CI: -0.01, 0.31, p=0.067), and cardiovascular fitness (Δ=1.57, 95% CI: 0.22, 2.92, p=0.024) compared to the control. 8. When including only subjects who attended at least 40% of the sessions, the relative increase in CV fitness became non-significant.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Yin, Gutin (2005), Yin, Moore (2005), Gutin, Yin (2008), Wang, Gutin (2008), Yin, Hanes (2005) Georgia	FitKid afterschool physical activity policy (5 days/ week for 3 school years for 120 minutes) including 80 minutes of moderate-to-vigorous physical activity (20 minute warm-up with skill instruction; 40 minutes moderate-to-vigorous physical activity; 20 minute cool-down with stretching) ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* 1. Provision of a healthy snack *Complex:* Not reported	***DESIGN:*** Group randomized trial ***DURATION:*** 3 years ***SAMPLE SIZE:*** 182 (>40% session participation) 3rd grade students in 18 elementary schools; 9 control (n=289) and 9 intervention (n=312) ***PRIMARY OUTCOME:*** After school moderate-to-vigorous physical activity ***MEASURES:*** 1. Anthropometric measures: height and weight (body mass index [BMI]) and waist circumference 2. Dual Energy X-ray Absorptiometry (DEXA) (bone density, fat mass, and fat-free soft tissue [FFST]) 3. Physiological testing: blood pressure (cardiovascular fitness), cholesterol (non-fasting, high-density lipoprotein [cardiovascular fitness]), and heart-rate monitoring (cardiovascular fitness) 4. Modified version of School Activity and Nutrition Project Questionnaire (dietary intake) 5. Physical Activity Questionnaire for Children (PAQ-C) (free-living physical activity) 6. Physical Activity Enjoyment Scale (PACES) (physical activity enjoyment) 7. Pictorial Motivation Scale (PMS) (motivation for physical activity) 8. The Self-Perception Profile for Children (SPPC) (perceived competence) 9. The Task and Ego Orientation in Sport Questionnaire (goal orientation) 10. Criterion-referenced competency tests (CRCTs) (end-of-the-year academic assessment) 11. Parental questionnaire (accessibility and availability of physical activity, physical activity barriers, family history, child's physical activity history) ***DATA COLLECTION:*** Data collection occurred at the beginning and end of each school year for three years (2003-2006). Anthropometric and physiological data was collected by trained research staff and nurses. All collection of physiological measures (body composition, cardiovascular fitness, total cholesterol, high density lipoprotein cholesterol, and blood pressure) were conducted on school grounds in the Medical College of Georgia (MCG) FitKid Project Mobile Research Laboratory, which was equipped with a dual-energy X-ray absorptiometry device for body composition analysis. *(continued next page)*	5-13 year olds 48% boys, 52% girls, 61% Black, 31% White, 1.5% Asian, 1.5% Hispanic, 5% Other, 68% eligible for free/ reduced lunch (intervention sample) 64% African American, 27% white, and 9% other racial backgrounds, 54% female, 8.7 years (sd=0.6 y) (evaluation sample) ***ELIGIBILITY:*** Elementary schools had to have appropriate facilities and consent to have the program. Parents and students also needed to provide consent. ***EXPOSURE/ PARTICIPATION:*** 603 students were exposed to the intervention and 584 were included in the control.	***LEAD AGENCY:*** The research team was from the Medical College of Georgia, Regent University, the University of Louisville, the University of North Carolina-Chapel Hill, East Carolina University, the University of Texas-San Antonio, Metro Child Care Services, and the Centers for Disease Control and Prevention. ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not reported ***ADOPTION:*** An advisory board of 24 community leaders, school officials, and parents was created. The advisory board met annually to provide advice and assistance for the project. ***IMPLEMENTATION:*** The physical activity program was developed by a team consisting of representatives of FitKid instructors, research staff, and exercise physiologists. The coordinator from the Richmond County Board of Education (RCBE) served as a liaison for RCBE and schools to facilitate project implementation, recruitment, and use of facilities. Researchers from MCG assisted with implementation. FitKid instructors participated in 3 paid, mandatory staff meetings to discuss issues and learn about strategies, motivation, methods and exercise physiology. Control children received regular free "health screenings," accompanied by diet and physical activity information. ***FORMATIVE EVALUATION:*** Focus group discussions, small group meetings, and a parental survey were all undertaken to help with project development. MCG FitKid was piloted in two schools in 2002. ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** 1. Healthy snacks 2. School buses 3. Staff training manuals 4. Staff wages 5. Information letter from principal 6. Student informational packet and prepaid envelope 7. Physical activity and nutrition information (control) 8. After-school program instructors 9. Academic enrichment materials 10 FitKid t-shirts 11. Sports equipment 12. After-school program hand-books 13. Activity books ***FUNDING:*** The research was funded by the National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, USDA ***STRATEGIES:*** Not reported	***OVERWEIGHT/OBESITY:*** *Year 1: Intervention subjects met the 40% inclusion criteria for analysis* 1. The intervention group (n=182) showed a relative reduction in percentage of body fat [%BF] (Δ= -0.76, 95% CI; -1.42, -0.09, p=0.027), a greater relative gain in bone mineral density (Δ= 0.008, 95% CI; 0.001, 0.005, p=0.023), and a greater relative reduction in heart rate response to the step test (Δ= -4.4, 95% CI; -8.2, 0.6, p=0.025) compared to the control (N=265). 2. Intervention students had a greater decrease in %BF (mean(se)= 26.5±9.4 vs. 25.8±9.5) than the control subjects (n=265, mean(se)=26.9±9.7 vs. 26.8±9.7; p=0.027). 3. As attendance declined in the after-school program, the changes seen in %BF ([n=44] <20% attendance=0.18, p=0.38; (n=41) 20-39% = 0.56,p=0.39; (n=62) 40-59%= -0.23, p=0.34; (n=67) 60-79%=-0.83, p=0.34; (n=46) ≥80%= -0.93, p=0.39; Δ= 12.8, p=0.0004) and fat mass (<20% attendance= 0.72, p=0.24; 20-39%= 0.98, p=0.24; 40-59%= 0.60, p=0.22; 60-79%= 0.33, p=0.21; ≥80%= 0.31, p=0.24; Δ= 5.9, p=0.016) decreased. 4. As attendance decreased in the after-school program, changes seen in heart rate response to the stepping test declined (<20% attendance= -2.3, p=0.2.5; 20-39%= -1.7, p=0.2.7; 40-59%= -3.3, p=2.4; 60-79%= -7.8, p=2.4; ≥80%= -6.3, p=2.7; Δ= 4.8, p=0.029). 5. There was a marginally significant linear trend between program attendance and fat free mass [FFM](p=0.096). 6. Greater increases in bone mineral density [BMD] (Δ= 4.8, p=0.029) were observed with higher program attendance. 7. The relations between the changes in %BF (Δ=12.8, p=0.0004), BMD (Δ=4.8, p=0.029), cardiovascular fitness [CVF] (Δ=4.8, p=0.029) and attendance rate are also influenced by program attendance. *Year 3:* 8. Over the six measurement points, the intervention group increased more than the control group in bone density (p<0.01), fat-free soft tissue (p<0.01), weight (p<0.01), height (p<0.01), and body mass index (p<0.05). *(continued next page)*

(Continued from previous study)						
		Questionnaires incorporating all of the physical activity and dietary scales were administered by a FitKid research staff member to students. In spring 2003, parents of second grade students filled out a survey providing information on physical activity, accessibility, and availability. ***LIMITATIONS:*** Maturation rate of youth may have skewed the results; the sample was too large, which made testing and implementation difficult; conclusions related to generalizability of the program are somewhat limited; attendance was used as an indicator of dose, which may have inaccurately assessed effects				***PHYSICAL ACTIVITY:*** *Year 3:* 9. As time was spent in physical activity, fitness increased ($p<0.01$). ***COST:*** 10. Net intervention costs were estimated to be $317 ($956 minus $639). Compared with control condition, students who attended at least 40% of the intervention reduced % body fat by 0.76% (95% CI, -1.42 to -0.09) at an additional cost of $317 per student. 11. The per capita program delivery was calculated as the total program cost divided by the number of students who attended at least 40% of the sessions (n=182) and was estimated to be $956 during the 128 days of year 1. (Additional cost analysis data available in the [Wang, L., Gutin, B., Barbeau, P., Moore, J., Hanes Jr., J., Johnson, M., Cavnar, M., Thornburg, J., Yin, Z. (2008) Cost-effectiveness of a school-based obesity prevention program. Journal of School Health. 78;619-624.] article)

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Ward, Benjamin (2008); Benjamin, Ammerman (2007); Ammerman, Ward (2007) North Carolina	Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) program – Improvement of nutrition and physical activity policies and practices at child care centers and the overall center environment ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Centers developed action plans to improve ≥ 3 target environmental changes as a result of this study. 1. Intervention centers increased access to spaces to be physically active, availability of equipment to assist in being physically active, and structured time for physical activity. 2. Intervention centers decreased the sugary snacks and fried foods available, decreased access to the vending machine, increased fruit and vegetable servings, served reduced fat milk, and developed nutrition policies for the centers.	***DESIGN:*** Group randomized trial (Delayed intervention) ***DURATION:*** 6 months ***SAMPLE SIZE:*** 82 child-care centers (56 intervention, 26 control) in the intention-to-treat (ITT) analysis; 41 centers completed most/all of the intervention and were included in the as-per-protocol (APP) analysis. The sample also included 29 of 30 Child Care Health Consultants (CCHCs) (20 intervention, 10 delayed-intervention control) ***PRIMARY OUTCOMES:*** Physical activity (PA) and nutrition ***MEASURES:*** 1. Nutrition and Physical Activity Self-Assessment for Child Care [NAP SACC] (observation and document collection of current physical activity/nutrition policies and practices) 2. Environment and Policy Assessment and Observation (EPAO) – 75 items on nutrition/ physical activity environments, policies, and practices ***DATA COLLECTION:*** The NAP SACC was completed at baseline and follow-up by the child care center directors to identify current nutrition/ physical activity policies and practices. The EPAO was administered in all centers before and after the intervention by trained observers. Observers were trained by a 1-day workshop. The average of all NAP SACC subscale scores represents the total nutrition and physical activity scores. A change score (-2 to +2) was constructed for each item based on the degree of change at follow-up from the original item scores. ***LIMITATIONS:*** Insufficient consultant or staff time; self-selection may have led to the modest choice of items for change; one day of observation may have been inadequate to detect small changes	3-5 year olds 60% Non-White, 40% White (intervention) 65% Non-White, 35% White (control) ***ELIGIBILITY:*** The first 30 CCHCs with interest and working with ≥3 child-care centers meeting the eligibility requirements (enrollment of 20-150 children; participated in Child and Adult Care Food Program; a rating of 3-5 stars for quality child care; CCHC consent; no open case of abuse or neglect or serve only a special population were eligible). ***EXPOSURE/ PARTICIPATION:*** 29 of the 77 eligible CHCCs participated in the intervention (38%). 41 of the 82 child-care centers completed most or all of the intervention.	***LEAD AGENCY:*** The research team was from Harvard Medical School and Harvard Health Care, the University of North Carolina at Chapel Hill, and the North Carolina Prevention Partners. ***THEORY/FRAMEWORK:*** Social cognitive theory ***EVIDENCE-BASED:*** The study builds off of a literature review and interviews conducted to identify the current science base surrounding physical activity and nutrition in the child care setting. ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** The research team trained the CCHCs, distributed tool kits, and administered the NAP SACC. CCHCs were randomly assigned to an in-person (n=10) 3-hour training or web-based (n=10) training. CCHC's conducted the continuing education workshops, helped child-care center directors develop an action plan, and provided ongoing technical assistance to the center directors. The child-care center directors were responsible for implementing all of the environmental and policy changes from their action plans. The advisory group provided insight on the appropriateness and usability of the intervention and materials. ***FORMATIVE EVALUATION:*** Literature review (documenting physical activity and nutrition standards in child care settings); 15 in-person and telephone interviews with child care providers; 3 parent focus groups; pilot testing in 19 centers for feasibility and acceptability. ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** 1. Funding to convert areas for physical activity 2. Play-ground equipment (bikes, mats, slides, etc.) 3. Fruits and vegetables 4. Reduced fat milk 5. Continuing education workshop resources 6. Funds for CCHC trainings 7. Action planning and technical assistance materials 8. NAP SACC tool kit ***FUNDING:*** Centers for Disease Control and Prevention; the North Carolina Department of Health and Human Services, Division of Public Health ***STRATEGIES:*** 9 additional states are using the NAP SACC program to address childhood overweight	***PHYSICAL ACTIVITY:*** 1. There was no significant difference between intervention and control groups for total physical activity score from baseline to follow-up in the ITT or the APP analysis. 2. There was a positive change in the intervention group compared to a negative change in the control group (ITT: from 10.1, SD=2.4 to 10.9, SD=2.6 in the intervention group; from 11.0, SD=2.8 to 10.7, SD=1.8 in the control group, p=0.19) (APP: from 10.1, SD=2.4 to 11.1, SD=2.5 in the intervention group; from 11.0, SD=2.8 to 10.7, SD=1.8 in the control group, p=0.15). 3. For individual-item analysis using a mixed-model analysis revealed that intervention centers physical activity score increased (mean change score = 3.6), whereas the control group decreased (mean change score= -0.2) ($p<0.05$). ***NUTRITION:*** 4. Intervention centers had an 11% improvement in the EPAO score regarding total nutrition from baseline to follow-up (in ITT analysis) while no change was observed in the control centers, which was a significant difference ($p=0.06$). 5. There was a significant pre-post difference between intervention and control for total nutrition score ($p=0.01$) in the APP analysis (from 8.3, SD=1.4 to 9.6, SD=1.7 in the intervention group and 9.0, SD=1.8 to 9.0, SD=1.7 in the control group). 6. For the individual-item analysis, intervention centers had a mean change score of +4.3 for nutrition items, compared to -0.5 change score for control ($p<0.01$).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Trost, Fees (2008) Kansas	School policy implementing a Move and Learn Curriculum which integrated physical activity (PA) into all aspects of the half-day preschool curriculum, including math, social studies, science, language arts and nutrition education. ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Group non-randomized trial ***DURATION:*** 10 weeks ***SAMPLE SIZE:*** 42 students (20 intervention, 22 control) in 2 pre-school classrooms ***PRIMARY OUTCOME:*** Moderate-to-vigorous physical activity (MVPA) ***MEASURES:*** 1. Accelerometers (physical activity) 2. Observational System for Recording Activity in Preschoolers [OSRAP] (children's physical activity level, type of activity, physical location, learning context, and social grouping during specific learning contexts). ***DATA COLLECTION:*** Accelerometers were worn by participants twice per week throughout the 10-week period during preschool sessions. A 15-second sampling interval was used. Counts were classified as moderate-intensity (3-5.9 METs) or vigorous-intensity (≥ 6 METs) activity using the age-specific count cut-offs derived by Sirard and colleagues (2005). Observations using OSRAP were completed by 2 investigators and 2 research assistants twice per week over the 10-week period. Interobserver agreement for each component was >80%. ***LIMITATIONS:*** Accelerometers are unable to accurately measure certain types of playground activities (e.g., playing on swings, climbing and hanging on fixed equipment); study involved a relatively small number of children attending a single child-care center; the mostly null findings observed during the first 4 weeks may suggest that teachers were experiencing difficulty implementing the movement experiences as planned; PA levels were not monitored outside of the program; study did not directly evaluate the effect of the curriculum on academic performance or learning-related outcomes	3-5 year olds Although this was conducted as an efficacy study in a single child-care center, the positive results achieved by teachers and staff in this study suggest that the move and learn approach has strong potential for dissemination to other child-care settings. ***ELIGIBILITY:*** Written informed consent from each participant's parent or caregiver. ***EXPOSURE/ PARTICIPATION:*** 42 of the 48 students enrolled in the half-day program participated in the study.	***LEAD AGENCY:*** The program was run in collaboration with the local school district , child-care center, and the research team from Oregon State University and Kansas State University ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** The research team trained the teachers and staff in a one group training session. The teachers and staff implemented the curriculum. Teachers were required, at a minimum, to include two Move and Learn Curriculum activities lasting 10 minutes or longer in each 2.5-hour session. Activities were repeated several times throughout the week. Lead teachers selected activities adapted from Lets Move, Learn, and Have Fun! and Class Act programs developed by the Kansas Nutrition Network and Kansas State University Research and Extension. ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Structure checklist (day and time of implementation, children's responses during and after the activity)	***RESOURCES:*** 1. Curriculum materials 2. Resources for teacher and staff training 3. Training video 4. Teachers and staff ***FUNDING:*** United Methodist Health Ministry Fund, Hutchinson, Kansas ***STRATEGIES:*** Not reported	***PHYSICALACTIVITY:*** 1. After combining classroom and outdoor time, accelerometry data for intervention preschoolers exhibited similar MVPA levels to controls, with the exception of weeks 7 and 8, during which intervention preschoolers exhibited significantly higher levels of MVPA (approx. 14.4 min vs. 12.5 min, $p<0.05$). 2. When only classroom time was examined accelerometry data for intervention preschoolers exhibited significantly higher levels of MVPA than controls during weeks 5 and 6 (approx. 10.3 min vs. 9 min) and weeks 7 and 8, (approx. 11.1 min vs. 9.1 min), $p<0.05$ for both. 3. Using logistic regression analyses for observational data, intervention preschoolers were significantly more likely than controls to exhibit MVPA during circle time (22.8% vs. 10.3%; OR=2.6, 95% CI: 2.2-3.0), free-choice time outdoors (78.3% vs. 71.7%; OR=1.4, 95% CI: 1.2-1.8), and free-choice time indoors (26.7% vs. 23.5%; OR=1.2, 95% CI: 1.1-1.3).

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Kelder, Hoelscher (2005) Texas	CATCH Kids Club (CKC) – After school program requiring at least 30 minutes of daily student physical activity (PA), with at least 40% of physical activity time spent in moderate-to-vigorous physical activity (MVPA) ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* 1. Snack Component: once a week, children helped to prepare a healthful snack and discussed the snack's taste and composition *Complex:* 1. Program implementers were given a CKC physical activity box with a variety of activities appropriate for children in grades K-5 2. Education Component: 15 healthy eating and physical activity lessons (15-30 minutes each) divided into five 3 week units (5 modules). A program guide was developed to assist in lesson implementation	***DESIGN:*** Group non-randomized trial ***DURATION:*** 5 months ***SAMPLE SIZE:*** 157 children, grades 3-5 in 16 after school programs (8 in El Paso, 8 in Austin). At each location there were 4 intervention and 4 control programs for a total of 8 intervention sites and 8 control sites. ***PRIMARY OUTCOMES:*** Physical activity and dietary intake ***MEASURES:*** 1. System for Observing Fitness Instruction Time (SOFIT) (total lesson length, time spent at various activity levels, lesson contexts). 2. After-School Student Questionnaire (ASSQ) (food preferences, dietary knowledge, self-efficacy, intentions to choose healthful foods, participation in sedentary and sports activities) 3. Focus Groups (strengths and weaknesses of the program, intentions to continue using the program, perceptions of student learning and enjoyment) ***DATA COLLECTION:*** Evaluation of the physical activity component was conducted among all students in El Paso and Austin, but only in El Paso for the education component. Researchers observed students at each after-school program using SOFIT prior to implementation and post-intervention. Data collectors administered the ASSQ prior to and immediately following the intervention. Following the intervention, 12 focus groups were conducted with any personnel involved with the implementation of the program. ***LIMITATIONS:*** The education component was delivered only to 4 after-school intervention sites in El Paso, reducing study power; 258 individuals provided baseline measures but 101 were lost to follow-up; after-school personnel turnover hindered implementation; equipment storage for PA boxes was often unavailable; the classroom curriculum was found to be too complex and lengthy for practical implementation	Mean age was 9 years, split among grades 3 (42%), 4 (36%) and 5 (22%), 43% White, 34% Hispanic, 17% African American and 6% other ethnicity (evaluation sample) The results of the physical education component alone suggest it is feasible, effective and ready for larger scale evaluation or dissemination (potential reach). ***ELIGIBILITY:*** Children were excluded if they were in the kindergarten to 2nd grade because of the children's early level of cognitive development. ***EXPOSURE/ PARTICIPATION:*** In El Paso, all children received the 3 program components. In Austin, children received only the physical activity component.	***LEAD AGENCY:*** The research team was from University of Texas-Houston. ***THEORY/ FRAMEWORK:*** Social cognitive theory ***EVIDENCE-BASED:*** The intervention components were based on the Child and Adolescent Trial for Cardiovascular Health (CATCH), which was found to be successful at increasing healthy eating and PA. ***REPLICATION/ADAPTATION:*** Adapted CATCH for an after-school setting ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** The University of Texas- Houston research team distributed the intervention materials and conducted staff training. After-school staff were trained prior to the intervention in two 4-hour sessions. Midway through the intervention, a booster training session was held at each site, in which staff received a refresher on conducting structured physical activities and supplementary information about the lessons. After-school staff were responsible for implementing the intervention components. ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Weekly site visits to intervention sites (implementation progress, insurance of quality control, provision of assistance)	***RESOURCES:*** 1. Education lesson binder 2. Physical activity boxes 3. Resources for after-school staff training 4. Resources for snack lessons 5. Education program guide 6. Physical education equipment ***FUNDING:*** Paso del Norte Health Foundation and the International Life Sciences Institute ***STRATEGIES:*** Not reported	***PHYSICAL ACTIVITY:*** 1. The proportion of time on the playground engaged in MVPA increased among intervention children (27.38%) and decreased among control children (16.45%), net effect = 43.83%, p=0.001. 2. The overall time spent in MVPA at post-test was 56.8% at intervention sites and 31.3% at control sites (p=0.001). 3. A large and significant effect was observed for other/free play, where intervention schools reduced unstructured free time by 64 minutes (p=0.002) and increased game play by 30 minutes (marginally significant at p=0.10). 4. Large reductions in standing (-26% intervention effect, p=0.027) and sitting (-22% intervention effect, p=0.125) were observed. ***NUTRITION:*** 5. No significant effects on eating behavior were found (small sample size for ASSQ).

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Wilson, Evans (2005) South Carolina	After school physical activity intervention to increase moderate-to-vigorous physical activity to 60 minutes per day (2 hours per day, 3 days a week for 4 weeks) ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* 1. Snack (30 minutes) *Complex:* 1. Trained graduate students taught participants behavioral skills and motivation strategies to increase PA with friends and at home (30 minutes) 2. Strategic self-presentation videotape session to enhance motivation and self-concept for physical activity	***DESIGN:*** Group non-randomized trial ***DURATION:*** 4 weeks ***SAMPLE SIZE:*** 48 students aged 11-14 in grade 6 from 2 middle schools (28 intervention children, 20 control children) in a rural southeastern community ***PRIMARY OUTCOME:*** Moderate-to-vigorous physical activity (MVPA) ***MEASURES:*** 1. Height and weight (body mass index [BMI]) 2. Accelerometers (MVPA) 3. Questionnaire (motivation and self-concept for physical activity, physical activity self-efficacy, enjoyment of physical activity) ***DATA COLLECTION:*** A trained assistant gathered height and weight measurements. All measures were obtained at baseline and during week 4 of the intervention for all participants. Physical activity was measured over 5 consecutive days (Monday-Friday) using accelerometers, which have been found to be valid and reliable in minority adolescents (reliability coefficient = 0.90). The questionnaire used items as well as scales including, the Self-Efficacy for Exercise Behavior Scale (ICC = 0.89) and the Enjoyment Scale (ICC = 0.87-0.94) to assess different factors. Both scales were found to be valid and reliable for adolescent populations. ***LIMITATIONS:*** Quasi-experimental study design; small sample size; it was difficult to determine which components were effective due to multi-component approach	Rural 11-14 year olds (target population) *Intervention:* 64% girls, 36% boys, 85% African American, 89% free/reduced-price lunch *Control:* 85% girls, 15% boys, 80% African American, 75% free/reduced-price lunch (evaluation sample) ***ELIGIBILITY:*** Parental informed consent was required. ***EXPOSURE/ PARTICIPATION:*** 19 of the 24 participants (79%) missed none or only 1 day of the program, four students (17%) missed 2 or 3 days and only 1 student missed more than 3 days. Twenty-eight students were enrolled in the intervention program, with only 4 dropping out of the program (85% retention rate). Process data showed that students were engaged in PA for at least 50 min.	***LEAD AGENCY:*** The research team was from the University of South Carolina and the Sumter County Parks and Recreation department. ***THEORY/ FRAMEWORK:*** Social Cognitive Theory and Self-Determination Theory ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** Three trained staff provided oversight for the intervention program, and two staff members, trained in physical education and injury prevention, provided structure for the physical activity elements of the program. Adolescents in the intervention took ownership in developing the program and selected a variety of physical activities to participate in. Trained graduate students assisted students with video interviews. The comparison school received 4 weeks of general health education during regular school hours that did not emphasize physical activity. ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Attendance was recorded and a Process Evaluation Checklist (identifying the essential components that would characterize the student-centered physical activity program) was completed once per week during the study period by an independent evaluator.	***RESOURCES:*** 1. Video camera 2. Snacks 3. Materials for physical activity sessions 4. Trained graduate students and staff ***FUNDING:*** University of South Carolina and the Centers for Disease Control and Prevention ***STRATEGIES:*** Not reported	***PHYSICAL ACTIVITY:*** 1. Participants in the student-centered intervention showed a greater increase in time spent in moderate physical activity (MPA) [from 81.05 ± 34.41 min to 98.22 ± 27.22 min], moderate-to-vigorous physical activity (MVPA) [from 89.10 ± 40.31 min to 111.50 ± 29.69 min], and vigorous physical activity (VPA), [from 6.66 ± 4.99 min to 10.5 ± 15.74 min] than those in the comparison group (MPA from 89.95 ± 33.24 min to 73.77 ± 27.19 min; MVPA from 104.25 ± 41.35 min to 81.22 ± 30.45 min; VPA from 11.33 ± 34 min to 6.13 ± 5.4 min), p<0.01 for all; all results show unadjusted means. 2. Repeated measures analysis (controlling for sex and body mass index) showed that intervention students had a greater increase in time spent in MPA (adjusted means and standard errors= 99.36 ± 5.88 min vs. 72.63 ± 5.88 min), MVPA (113.94 ± 6.27 min vs. 78.78 ± 6.27 min) and VPA (11.33 ± 1.07 min vs. 5.31 ± 1.07min) than those in the comparison group, p<0.02 for all. 3. Analyses comparing accelerometer estimates of program versus non-program days showed that there were no significant differences in physical activity levels for MPA (101.47 ± 29.59 min vs. 93.52 ± 36.30min) or MVPA (118.30 ± 34.52 min vs. 101.65 ± 39.79 min). VPA (16.34 ± 14.42 min vs. 8.13 ± 5.49 min, p <0.02) was greater during program as compared to non-program days.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Farley, Meriwether (2007), Farley, Meriwether (2008) Louisiana	After school and weekend access to safe, supervised schoolyards ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* 1. Playground supplied with footballs, basketballs, jump ropes, Frisbees, balls, hoops, parachutes, a music player, and sprinkler 2. Attendants supervised playgrounds when open 3. Publicized availability of the schoolyard for free play	***DESIGN:*** Group non-randomized trial ***DURATION:*** 23 months ***SAMPLE SIZE:*** ~511 second to fifth grade students from two neighborhood schools (1 intervention; 1 control) ***PRIMARY OUTCOME:*** Non-school time physical activity ***MEASURES:*** 1. Height and weight (body mass index [BMI]; n=511 students [300=intervention]; 160 students had complete baseline and follow-up data) 2. Modified System of Observing Play and Leisure Activity in Youth (SOPLAY) (physical activity levels in the schoolyard and in the neighborhoods surrounding each school) 3. Self-reported surveys (screen time, activities during past day and weekend; n=485 [280= intervention]) 4. Daily temperature (mid-point time of play) ***DATA COLLECTION:*** Researchers collected anthropometric data from the children who were measured at baseline and at two follow-up points (15 months, 22 months). SOPLAY observations occurred after school on 46 weekdays and 16 weekend days during the school year, with 9 to 13 days occurring in every 3-month observation period. SOPLAY has previously been found to be valid and reliable. For schoolyard observations, two trained observers used mechanical counters to count children who appeared to be in the target age range and recorded the child's activity level (sedentary, walking, very active). Neighborhood observations were made in an 8-by-8 block area around each school. A driver drove slowly on standard routes, while the observer identified children outdoors who appeared to be in the target age range and recorded the child's activity level. Surveys were administered simultaneously in intervention and comparison schools on Tuesdays in March or April. ***LIMITATIONS:*** Self-reported data from young children; unable to control for time-dependent environmental factors; children who were in backyards were not counted; seasonality; only addressed physical activity levels of children not directed by adults	6-14 year olds, Urban, Lower income 99% Black; 37% house-holds headed by women (intervention population) In both schools, more than 99% of the children were African-American. ***ELIGIBILITY:*** Any children 2nd -8th grade, kindergarten, or in 1st grade accompanied by an older sibling or parent were allowed to use the intervention schoolyards. Written parental consent was required. ***EXPOSURE/ PARTICIPATION:*** The entire intervention school was exposed to the intervention (enrollment between 366 and 381 students each school year). Children's attendance after school was measured by attendants.	***LEAD AGENCY:*** The research team was from Tulane University and the University of South Carolina. ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** The intervention schoolyard was open and supervised during non-school hours after school on weekdays and on weekends. Attendants (3-4), almost all of whom were teachers, were paid to provide supervision and verify consent and age. Attendants did not organize, require, or suggest specific activities to children. Before collecting data, observers were trained in SOPLAY for an average of three 2-hour trainings sessions. ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** 1.Additional liability insurance for the school ($550/year) 2.Playground equipment and supplies 3.Paid attendants (Total= $49,000/ year) 4.Training materials for SOPLAY ***FUNDING:*** The research was funded by a grant from the National Heart, Lung, and Blood Institute. ***STRATEGIES:*** Not reported	***OVERWEIGHT/OBESITY:*** 1. The mean BMI change increased 2.25 kg/m^2 in the intervention school and 2.39 kg/m^2 in the comparison school (p=0.68) (n=160). ***PHYSICAL ACTIVITY:*** 2. For all 8 quarters combined, researchers observed 30% more active children in the intervention neighborhood compared with the comparison neighborhood (50.4 vs. 38.7; p<0.001). 3. For the entire intervention period, 84% more children were outdoors and active in the intervention neighborhood and schoolyard combined than were in the comparison neighborhood (71.1 vs. 38.7, p<0.001). 4. Children in the basketball and equipped concrete areas were more likely than children in the field to be "very active" (31% vs. 25%, p=0.05 and 34% vs. 25%, p<0.01, respectively). Children playing in the play structure area were nearly twice as likely as those in the field to be coded as "very active" (51% versus 25%, p<0.001). ***SCREEN TIME:*** 5. From baseline to the 2 year follow-up, the percentage of children who reported watching television increased in the control school from 83% to 92% and decreased in the intervention school from 92% to 88% (p=0.018). The percentage who reported watching movies increased from 61% to 70% in the control school and decreased from 60% to 50% in the intervention school (p=0.004). The percentage who reported using video games increased from 55% to 61% in the control and decreased from 62% to 48% in the intervention school (p=0.001).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Williams, Carter (2009) New Mexico	Animal Tracker (AT) –pre-school policy to increase structured physical activity (PA) and gross motor skills by incorporating a 10 minute period of structured physical activity into the curriculum each day ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* 1. Teachers were encouraged to gradually increase their daily step count	***DESIGN:*** Before and after study ***DURATION:*** 10 weeks ***SAMPLE SIZE:*** 270 pre-school students and 32 teachers from 9 Head Start centers in New Mexico ***PRIMARY OUTCOME:*** Physical activity ***MEASURES:*** 1. Teacher physical activity survey (self-reported physical activity) 2. Pedometers (step counts) ***DATA COLLECTION:*** This intervention was a pilot study to assess the feasibility of the Animal Tracker physical activity curriculum. The teachers took physical activity surveys at pretest and posttest to estimate the days per week they participated in 4 types of physical activity: sports, stretching, toning, and walking or riding a bike. Teachers were given pedometers at the teacher training and mean step counts from baseline were compared to subsequent 10-week mean counts. ***LIMITATIONS:*** Self-reported data; child physical activity levels were not measured directly, and changes in motor skills were not assessed in this pilot study due to funding constraints and the relatively brief 10-week intervention	3-5 year olds Adults, Lower income (target population) 74% Latino/ Hispanic, 15% White, 8% bi-or multi-racial, and 2% African American (evaluation sample) ***ELIGIBILITY:*** Not reported ***EXPOSURE/ PARTICIPATION:*** Not reported	***LEAD AGENCY:*** The researchers (intervention development and evaluation) and the school teachers (implementation) ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** Teachers received a 1.5 hour training prior to the intervention that was conducted by the research team and a health education specialist. Training included a curriculum overview including the importance of structured physical activity, role playing of activities and encouragement for walking among teachers. Teachers implemented the Animal Tracker curriculum in the classrooms. ***FORMATIVE EVALUATION:*** The Animal Tracker curriculum was tested in preschool centers of varying size and ethnic/economic composition in New Hampshire, New York City, and Georgia. ***PROCESS EVALUATION:*** Animal Tracker Unit Evaluation Forms were used to assess the frequency and duration of activities, along with the teachers' perceptions of the curriculum.	***RESOURCES:*** 1. Program materials including compact disc of activities 2. Health education specialists for teacher training 3. Materials for the teacher training ***FUNDING:*** General Mills Champions Youth Nutrition and Fitness Grant ***STRATEGIES:*** Not applicable, as the intervention was a feasibility study.	***PHYSICAL ACTIVITY:*** 1. Baseline mean step count for teachers (n=19) was 6,165 (standard deviation [SD] = 1,029) and was not significantly different from the subsequent 10-week mean step count of 6,549 (SD= 983). 2. There was a significant increase in the number of days per week teachers (n=17) reported participating in the 4 types of physical activity (sports, stretching, toning and walking/biking) from 2.2 days per week of physical activity at baseline to 3.3 days per week at follow-up (p=0.003). ***POLICY CHANGE:*** 3. The average amount of time pre-school students (n=270) spent per week engaged in structured physical activity was 47 minutes (program goal was 50 minutes). 4. The program was implemented an average of 4.12 times per classroom per week; the mean total for the 10 weeks was 41.25 physical activities per classroom.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Slawta, Bentley (2008) Oregon	Be a Fit Kid – after school program designed to provide physical activity opportunities and healthful foods for children ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* 1. Provision of healthful foods *Complex:* 1. Physical activity component emphasized cardio-vascular fitness 2. Nutrition component provided current dietary guidelines and sampling of fruits and vegetables, foods containing unsaturated fats, and whole grains 3. Fieldtrips to supermarkets 4. Parent component: Initiation lecture was held prior to start of program covering nutrition and physical activity principles	***DESIGN:*** Before and after study ***DURATION:*** 12 weeks ***SAMPLE SIZE:*** 75 students from 4 elementary schools ***PRIMARY OUTCOMES:*** Physical activity (PA) and overweight/obesity ***MEASURES:*** 1. Anthropometrics (height and weight [body mass index], tricep, subscapular, and calf skinfold thickness) 2. Timed mile run and number of sit-ups in 60 seconds (fitness) 3. Nutrition test (nutrition knowledge) 4. 24-hour food log filled out by parents (diet composition) 5. Parental questionnaire (changes in child eating habits) 6. Biochemical testing (venipuncture: lipids and lipoproteins) ***DATA COLLECTION:*** The timed mile run and number of sit-ups in 60 seconds were administered before and after the intervention. Diet composition was assessed by analyzing the food log using Diet Analysis Plus 6.0 software. The parent questionnaire was distributed to parents following the 12 week intervention and 6 months following the completion of the program. Anthropometric data was collected at baseline and follow-up and used to calculate BMI. Venous blood was collected in the morning by venipuncture following a 12-hour fast to measure lipids and lipoproteins at baseline and follow-up. ***LIMITATIONS:*** Parental questionnaire assessing changes in eating habits did not include questions regarding specific decrease or increase in any of the foods; study lacked a control group; intervention may not have been long enough to see significant reduction in levels of LDL-cholesterol	6-12 year olds ***ELIGIBILITY:*** Not reported ***EXPOSURE/ PARTICIPATION:*** Not reported	***LEAD AGENCY:*** The research team was from Southern Oregon university, Klamath Tribal Health and Family Services, Benton County Health Department, Eugene Downtown Athletic Club. ***THEORY/FRAMEWORK:*** PRECEDE-PROCEED Model ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** The after school program was offered 3 times a week for 2 hours over the course of 12 weeks. The physical activity component was run by college students who worked with small groups focusing on strength training, jumping activities, and yoga. Other leisure time activities were accomplished by hiking and ice-skating field trips. Children were rewarded with incentives when they met fitness goals. Following the physical activity component, a variety of healthy food items were distributed to children for them to sample (e.g. salmon and almond butter). This was accompanied by education focusing on current dietary guidelines emphasizing diets rich in fruits and vegetables, unsaturated fats, and whole grains. Nutrition packets were sent home weekly to parents with raffles for children returning signed forms from parents. Field trips to supermarkets taught children what foods to select. The local food cooperative contributed money ($1,000) for healthful foods, as did many smaller community sponsors. ***FORMATIVE EVALUATION:*** Using the PRECEDE-PROCEED model, the creators of the program assessed the availability of necessary resources. Based on the number of student volunteers, available time of the project director to implement the program, and limited funding, they developed an after-school program for a maximum of 100 volunteer children. ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** 1. Staff time 2. Incentives (pancake mix, cereal, medals) 3. Donated foods 4. Nutrition packets 5. Raffle prizes ***FUNDING:*** Southern Oregon University, Rogue Valley Medical Center Lab., Ashland Food Cooperative and several community sponsors (n'Spired Foods, Cycle Sport, Ski Ashland, Ashland Community Hospital) ***STRATEGIES:*** The program has since been established as a program within the non-profit organization Healthy Kids Now. It is currently included in the 4th grade curriculum of one southern Oregon school district.	***PHYSICAL ACTIVITY:*** 1. By using a t-test, significant improvements were observed in all fitness measures from pre- to post-intervention: (Mile-run: pre= 13:33 minutes to post = 10:34 minutes [p<0.0001]; Sit-ups: pre= 23 to post= 30 [p<0.0001]). 2. At baseline, only 19% of the Be a Fit Kid sample children were able to meet the national averages for the mile run, which rose to 59% after the intervention (no statistics given). ***OVERWEIGHT/OBESITY:*** 3. By using a t-test, significant improvements were observed in body composition measures. BMI for students pre-intervention was 21 ± 5 (SD), and post-intervention was 20 ± 5 (SD), p<0.0001). ***NUTRITION:*** 4. By using a t-test, significant improvements were observed in some dietary habits from pre- to post-intervention including total fat (pre= 33% to post= 26%, p<0.0001), saturated fat (pre= 12% to post= 8%, p<0.0001), and mono-unsaturated fat (pre= 10% to post= 8% p=0.009). 5. More than 75% of children increased their intake of vegetables, fruits, whole grains, healthy fats, and water, as well as decreased their intake of cheese, red meat, candy, and soda (data not shown). 6. All children who drank reduced fat or whole milk switched to low-fat milk, and a few who drank low-fat milk changed to non-fat milk (data not shown). ***OTHER:*** 7. By using a t-test, there were significant reductions observed in high density lipoprotein cholesterol from pre- to post-intervention (pre= 1.2±0.1 to post= 1.2±0.3, p=0.015). ***MAINTENANCE:*** 8. Positive changes made in dietary habits were maintained by the majority of children 6 months following the intervention (data not reported).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Dowda, Pate (2004) South Carolina	Availability of preschool policies to increase the amount and quality of moderate-to-vigorous physical activity including: 1. 3 or more field trips per month 2. Community organization visits 3. Electronic media use ≤45 min/day 4 ≥45 minutes/ day of time spent outside 5. ≥50% of teachers with a college degree 6. ≥120 minutes/ day of free-time physical activity opportunities 7. ≥ 90 minutes/ day of outside physical activity 8. ≤ 17 children per classroom 9. Preschool quality score ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 266 children from 9 preschools. Three types of preschools were included in the study: private preschools (n=3), faith-based preschools (n=3) and federally supported Head Start programs (n=3). ***PRIMARY OUTCOME:*** Moderate-to-vigorous physical activity (MVPA) ***MEASURES:*** 1. Height and weight (body mass index [BMI]) 2. Observation System for Recording Activity in Preschools (OSRAP) (intensity of physical activity) 3. Early Childhood Environment Rating Scale-Revised Edition (ECERS-R) (quality of preschools) 4. Administrator interviews (physical activity and sedentary activity policies and practices) 5. Parent questionnaire (race/ethnicity, age, sex) ***DATA COLLECTION:*** The Observation System for Recording Activity in Preschools (OSRAP), which was modified from the Children's Activity Rating Scale (CARS), was used to assess intensity of physical activities in young children. Children were observed for one hour on 2-3 days, including a morning and afternoon period. Intra-class correlation coefficients (ICCs) for the mean activity rating ranged from 0.91 to 0.98. Interviews were conducted by a member of the research team with an administrator in each preschool to determine the physical activity and sedentary activity policies and practices of the preschool. For each policy or characteristic from the interview, the preschools were divided into 2 groups, those promoting physical activity (PPA) and those not promoting physical activity (NPA). One classroom at each preschool was evaluated by a researcher using the Early Childhood Environment Rating Scale-Revised Edition (ECERS-R). ECERS-R assessed space and furnishings, personal care routines, language-reasoning, activities, interaction, program structure, and parent and staff needs ***LIMITATIONS:*** Cross-sectional study design did not allow for causal or temporal inferences; study was limited to nine participating schools	Preschool children 3-5 years old (targeted population) 47.4% Male, 62.4% African American, 32.7% White, and 4.9% Other (evaluation sample) ***ELIGIBILITY:*** Children who spent at least six hours per day, five days per week at the preschool were eligible. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** The research team was from Stanford University, Kansas State University, and the University of South Carolina. ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not applicable ***PROCESS EVALUATION:*** Not applicable	***RESOURCES:*** Not applicable ***FUNDING:*** The research was funded by a Gerber Products Company, Parsippany, New Jersey. ***STRATEGIES:*** Not applicable	***PHYSICAL ACTIVITY:*** 1. Children (n=266) in preschools reporting four or more physical activity-related field trips per month spent significantly more time in moderate to vigorous physical activity (MVPA) than children in preschools that participated in fewer trips (mean[standard error]=7.8[0.8] vs. 4.3[0.6], p=0.01). 2. Children (n=264) in preschools with smaller classes spent more time in moderate-to-vigorous activity than those in preschools with larger classes, the difference was marginally significant (mean [standard error] =7.1[1.0] vs. 4.5[0.7], p=0.07). 3. Support from community organizations, television watching/ computer use, and preschool quality were not associated with MVPA levels either overall or on the playground. ***SEDENTARY BEHAVIOR:*** 4. Children (n=266) in preschools with overall higher quality scores spent significantly (mean [standard error] 54.7[2.6] vs. 63.3[2.4], p=0.04) less time in sedentary activity than did children attending lower quality preschools. 5. The number of monthly field trips, involvement with community organizations, television/computer time, time spent outdoors, amount of free time, and class size were not associated with sedentary activity either overall or when children were on the playground. No results reported for BMI.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Dowda, Brown (2009) South Carolina	Preschool policies and characteristics promoting physical activity (PPA) including: 1. 3 or more field trips per month 2. 4 or more community organization visits per month 3. ≥60 minutes/day of teacher-led physical activity 4. ≥60 minutes/ day of time spent outside 5. ≥50% of teachers with a college degree 6. ≥120 minutes/day of physical activity opportunities 7. Teachers with recent physical activity training 8. Low electronic media use (<7% of observations) 9. ≥1 piece portable playground equipment 10. ≤8 pieces fixed playground equipment 11. ≤15 children per classroom 12. Playground size ≥4157 ft^2 13. Classroom size ≥347 ft^2 ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 476 students from 20 preschools that were enrolled in the Children's Activity and Movement in Preschool Study. Three types of preschools were included in the study: commercial preschools (n=11), faith-based preschools (n=6) and federally supported Head Start programs (n=3). ***PRIMARY OUTCOME:*** Physical activity (PA) and sedentary behavior ***MEASURES:*** 1. Height and weight (body mass index [BMI]) 2. Accelerometers [n=299](physical activity) 3. Director interview (physical activity and sedentary activity policies, practices of preschools) 4. Early Childhood Environment Rating Scale-revised (ECERS-R) (quality of preschools: space and furnishings, personal care routines, language reasoning, activities, interaction, program structure, provisions for parents and staff) 5. The Observational System for Recording Physical Activity in Children - preschool version [n=476] (electronic media use, indoor preschool activity) 6. Direct observations (classroom and playground size, equipment inventory [number of fixed and portable playground equipment]) 7. Parent/guardian survey (sociodemographic data) ***DATA COLLECTION:*** The data for this study comes from the Children's Activity and Movement in Preschool Study. Data were collected at each pre-school during two, two-week data collection waves, separated by 13 to 19 months. For each policy or characteristic from the interview, the preschools were divided into 2 groups, those promoting physical activity (PPA) and those not promoting physical activity (NPA). The ECERS-R was administered by a researcher in 1 classroom at each preschool. Higher-quality preschools had higher scores, and preschools were divided into 2 groups by using an overall average score of 5, which represents a good score (≤5 for NPA and >5 for PPA). Children were observed for 30 seconds (i.e., 5 hours per child) for a minimum of 600 intervals. Children wore accelerometers over a 2 week period. ***LIMITATIONS:*** Causality cannot be determined by using cross-sectional study data; generalizability is limited because sample was from one city in South Carolina	3-5 year olds 49% Black, 42% White, and 10% other race/ethnicity (evaluation sample) ***ELIGIBILITY:*** All 3- to 5-year-old children from preschools enrolled in the Children's Activity and Movement in Preschool Study were asked to participate. Parental written informed consent was required. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** The research team was from the University of South Carolina and Michigan State University. ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** National Institute of Child Health and Human Development ***STRATEGIES:*** Not applicable	***PHYSICAL ACTIVITY:*** 1. Compared to NPA schools, children had more moderate to vigorous physical activity (MVPA) per hour in PPA preschools that had higher quality (ECERS-R scores of >5; 7.5±0.3 [PPA] vs. 6.2±0.4 [NPA]; p=0.01); lower use of electronic media (7.3±0.3 vs. 5.9±0.6; p=0.03); at least one piece of portable equipment on the playground (7.4±0.3 vs. 6.2±0.4; p=0.03); less fixed playground equipment (7.6±0.3 vs. 6.4±0.4; p=0.02); and larger playgrounds (7.3±0.3 vs. 6.0±0.5; p=0.02). 2. Compared to NPA schools, the preschools with all 5 characteristics associated with physical activity had significantly more MVPA time (8.3±0.5 vs. 6.6±0.3; p<0.001). All 5 of the higher PPA preschools also had provided recent physical activity training for their teachers. ***SEDENTARY BEHAVIOR:*** 3. Compared to NPA (not promoting physical activity) schools, children in PPA (promoting physical activity) schools had fewer sedentary minutes/ hour (ECERS-R scores of >5; mean ± standard error = 32.8±0.8 [PPA] vs. 36.1±1.1 [NPA]; p=0.01); lower use of electronic media (33.4±0.8 vs. 36.7 ±1.5; p=0.05); at least one piece of portable equipment on the playground (33.4±0.8 vs. 36.7 ±1.5; p=0.05); less fixed playground equipment (32.2±0.8 vs. 35.8±0.9; p<.01); and larger playgrounds (29.9±1.0 vs. 35.2±0.6; p<.001). 4. Compared to NPA schools, the preschools with all 5 characteristics associated with physical activity (see above) had significantly less sedentary activity time (29.9±1.0 vs. 35.2±0.6). All 5 of the higher PPA preschools also had provided recent physical activity training for their teachers.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Choy, McGurk (2008) Hawaii	In-Motion, a joint use agreement pilot project to increase physical activity by utilizing school facilities to provide organized recreational classes during and after school hours. ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Organized recreational classes for students, staff, and community members during and after school hours	***DESIGN:*** Non-comparative study ***DURATION:*** 12-24 months for organized classes; joint-use policy is ongoing ***SAMPLE SIZE:*** 1,040 students (n=906), teacher and staff (n=68) and community members (n=66) from one high school and the surrounding community ***PRIMARY OUTCOME:*** Project impact ***MEASURES:*** 1. Surveys (project awareness, participation and satisfaction) ***DATA COLLECTION:*** The Healthy Hawaii Initiative Evaluation Team (HHIET) developed the evaluation plan based on the Centers for Disease Control and Prevention's Framework for Program Evaluation in Public Health. In May 2006, after school recreational classes had been offered for 1 year, students, teachers and staff, and community members were surveyed. Surveys were distributed to all homeroom classes, all mailboxes of teachers and staff, and 3 community organizations. Incentives (e.g., gift cards) were used to encourage survey participation. ***LIMITATIONS:*** No baseline data; no control group; low survey response rates; potential survey response bias may have occurred if people who liked the program were more likely to participate; difficulty recruiting teenagers for programs	Urban 14-18 year old children and adults *Farrington High School students:* >60% free/ reduced-cost lunches, 58% Filipino, 13% Samoan, 12% Native Hawaiian, 64.3% of adolescents living in the Farrington area reported living in unsafe neighborhoods. (target population) *Farrington neighborhood:* >46,000 residents, 46.7% Filipino, 15.6% foreign-born recent immigrants, $14,634 per-capita income. (intervention sample) Residents of the community have higher rates of unemployment, higher use of welfare and food stamp assistance, and lower levels of home ownership than all residents in the state. (target population) Most participants were female (66.5%), younger than 18 years (52.8%), Filipino (40.9%), and Farrington High School students (52.2%). (evaluation sample) ***ELIGIBILITY:*** Farrington High School was chosen on the basis of the principal's receptiveness to a joint-use agreement, active community involvement in the campus, and mutual benefits for the Honolulu Department of Parks and Recreation and Farrington High School. ***EXPOSURE/PARTICIPATION:*** In-Motion has served more than 1,000 registered participants. Approximately 11% (n=98) of responding students indicated that they had attended one of In-Motion's classes; however, this proportion is probably higher, as students may not have realized that some classes they attended were affiliated with In-Motion.	***LEAD AGENCY:*** Multiple agencies collaborated including the Honolulu Department of Parks and Recreation, the Hawaii State Department of Education (DOE), Farrington High School staff and the Healthy Hawaii Initiative Evaluation Team from the University of Hawaii ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** The joint-use agreement was approved by both the Department of Parks and Recreation and the Department of Education agencies, and was adopted by the Council of the City and County of Honolulu on June 7, 2006. Developing and officially approving the joint-use agreement took 18 months. ***IMPLEMENTATION:*** In-Motion was managed by 2 full-time project staff: a project manager (a Department of Parks and Recreation employee) and a project coordinator (a contracted employee). The joint-use agreement set parameters for use and maintenance of facilities, fee schedule, staffing, use of materials and equipment, liability and risk of loss. The Dept. of Parks and Recreation assumed liability for In-Motion activities. The school assumed responsibility for general cleaning and maintenance of the facilities and did not charge the Dept. of Parks and Recreation any fees for use of facilities. Classes were offered to students, teachers/staff and community members free of charge and were offered at different times of the day to attract different target groups (e.g., lunchtime classes for students, early evening classes for working adults). ***FORMATIVE EVALUATION:*** 1. Assessment of joint-use potential of 7 schools (available athletic facilities, recreational needs and opportunities, use of facilities after hours, joint-use agreement receptiveness). 2. Surveys from students, staff, and residents identified which physical activities would be most popular and the days and times that would encourage maximum participation. ***PROCESS EVALUATION:*** Participant surveys were distributed after each physical activity class to measure participant satisfaction and perceptions of physical activity.	***RESOURCES:*** 1. Project manager and coordinator 2. Class instructors 3. Recruitment material (e.g., daily bulletins, banners, flyers, newspaper advertisements) 4. Equipment for classes ***FUNDING:*** Tobacco Settlement Special Funds through a grant from the Healthy Hawaii Initiative, Hawaii State Department of Health ***STRATEGIES:*** The Department of Parks and Recreation is exploring options for continuing In-Motion once the current funding period is completed, including expansion to other schools and community organizations. However, the recreational activities offered by In-Motion depend on external funding and will continue only if such funding is secured.	***ENVIRONMENT CHANGE:*** 1. Since the joint use agreement began, over 900 physical activity class sessions have been offered to participants. ***PROJECT IMPACTS:*** 2. 61.6% of In-Motion participants (n=320) strongly agreed that In-Motion provided a safe place to exercise (22.2% agreed, 11.6% neutral, 2.2% disagreed, 3.2% strongly disagreed). 3. 59.4% of In-Motion participants (n=320) strongly agreed that the In-Motion recreational classes helped them to exercise more (23.4% agreed, 10.9% neutral, 1.9% disagreed, 0.9% strongly disagreed). 4. All responding teachers and staff agreed that the project had a positive impact on the school and that it was beneficial to students. They reported that the project provided needed opportunities for physical activity, incurred social benefits (e.g., making new friends), kept students out of trouble, and promoted healthy lifestyles.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
International						
Reilly, Kelly (2006) Scotland	Movement and Activity Glasgow Intervention in Children (MAGIC) – Nursery school physical activity policy to increase physical activity by implementing three 30 minute physical activity sessions each week for 24 weeks ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* 1. Home element (informational leaflets on physical activity in home, television reduction)	***DESIGN:*** Group randomized trial ***DURATION:*** 24 weeks ***SAMPLE SIZE:*** 545 preschool children (268= intervention, 277= control) in 36 nurseries in Scotland. Nurseries were stratified and paired by type, size, and socioeconomic status. Each pair was randomly assigned to the intervention or control group. ***PRIMARY OUTCOME:*** Physical activity (PA) ***MEASURES:*** 1. Height and weight (body mass index [BMI]) 2. Accelerometry data (moderate-to-vigorous physical activity and sedentary behavior) 3. Fundamental movement assessment battery (objective assessment of motor skills) ***DATA COLLECTION:*** Data was collected at baseline, six months, and 12 months after the start (2002) of the intervention. All primary and secondary outcomes were measured less than one week apart in the paired nurseries. Anthropometric measures were taken by a researcher blinded to group allocation. Over a 6 day period, accelerometry data was collected as counts per minute. The fundamental movement assessment battery provided a global motor skills score of 0-15, which was a composite of performance in jumping, balance, skipping, and ball exercises. This assessment was found to have high validity and reliability in preschool children. ***LIMITATIONS:*** The intervention may have provided an inadequate "dose" of physical activity to have any net impact on overall physical activity (accelerometry data) or the more distal outcome of BMI; the BMI is multifactorial, and while it is acceptable in trials of this kind and practical for large studies, it is not ideal; the pilot study was implemented by head-teachers and may have achieved a higher quality whereas the intervention was delivered by nursery staff	3-4 year olds ***ELIGIBILITY:*** Eligible nurseries had to have at least 12 children in their class. Parents were required to give informed written consent in order to participate. ***EXPOSURE/ PARTICIPATION:*** Attendance in each physical activity session was recorded. At the level of the child, 71% of prescribed sessions were attended (lower quartile 57%, upper quartile 81%).	***LEAD AGENCY:*** The research team was from the University of Glasgow. ***THEORY/ FRAMEWORK:*** The home based element was taken largely from the health education model. ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** Nursery staff attended 3 training sessions and implemented the intervention. Control groups did not receive any intervention and agreed not to enhance their physical development and movement curriculum. ***FORMATIVE EVALUATION:*** A pilot study was conducted in 4 nurseries using 60 child participants over the course of 12 weeks to test the intervention. ***PROCESS EVALUATION:*** Nurseries recorded each session of physical activity delivered	***RESOURCES:*** 1. Nursery and home curriculum 2. Resource packet of materials (2 leaflets) 3. Physical activity posters ***FUNDING:*** The research was funded by British Heart Foundation, Glasgow City Council, and the Caledonian Research Foundation. ***STRATEGIES:*** Not reported	***OVERWEIGHT/OBESITY:*** 1. Group (intervention vs. control, n=481) was not a predictor for body mass index [BMI] at six months (intervention mean= 0.46 [standard deviation= 1.03], control mean=0.43 [standard deviation=1.08], p=0.87) or at 12 months (intervention mean= 0.41, [1.05], control mean= 0.43 [1.10], p=0.90) nor were any of the other fixed effects (age, time, group, sex, interaction) significant during either data collection. ***PHYSICAL ACTIVITY:*** 2. Children in the intervention group had significantly higher performance in movement skills tests than control children at six month follow-up (intervention score=11.5 [2.3], control score=10.7 [2.5], 95% CI 0.3-1.3, p=0.0027; n=420) from baseline (intervention score=7.9 [2.6], control score= 7.7[2.7]). The average difference in improvement being 0.8 units (0.3 to 1.3 units). 3. In modeling, the change in score for fundamental movement skills increased in girls more than boys, the average difference in improvement being 0.7 units (0.3 to 1.1, p=0.001, n=481)(no further statistics). 4. Group was not significant for modeling log counts per minute (p=0.18) or percentage of time spent sedentary (p=0.08) but was marginally significant for log percentage time in moderate or vigorous physical activity (the mean value being greater in the control nurseries by 0.1, 0.0 to 0.2, p=0.05). ***COST:*** 5. The nursery element of the intervention was intended to be inexpensive and therefore generalizable (capital cost <£200, €297, $377). 6. The home-based element of the intervention had two parts: each participating family received a resource pack of materials costing £16 (€24, $30), with guidance on linking physical play at nursery and at home, and two simple health education leaflets. ***IMPLEMENTED AS INTENDED:*** 7. At the nursery level, 83% of prescribed sessions of the physical activity program were actually offered.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Cardon, Labarque (2009) Belgium	Addition of playground equipment and markings at public pre-schools 1. Play equipment was made available to the children during all recesses. 2. One-hour introduction to play equipment for children ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Group randomized trial ***DURATION:*** Not reported ***SAMPLE SIZE:*** 583 students (437 intervention, 146 control) attending 40 public pre-schools in Flanders, Belgium Schools were randomly assigned to one of the following treatment conditions (10 schools per group): play equipment (n=145); playground markings (n=147); play equipment and playground markings (n=145); control condition (n=146). ***PRIMARY OUTCOME:*** School time physical activity (PA) ***MEASURES:*** 1. Accelerometers (physical activity level during recess) ***DATA COLLECTION:*** Pre-testing was performed in November and December 2007. To avoid measuring only the novelty effect of the interventions, post-testing was not performed immediately but 4 to 6 weeks after the implementation of the intervention, in February and March 2008. Accelerometers measured physical activity in 15-second sampling intervals during the recess after the lunch break. Twelve to twenty children from each school were randomly selected for physical activity measurement. The accelerometers were attached to the children before the start of the lunchtime recess and removed after the recess. ***LIMITATIONS:*** There were significant differences at baseline between the control condition and the intervention conditions for the percentages of time engagement in sedentary, light, and moderate activity; use of cut-points to convert accelerometer outputs into percentages of recess times spent at different intensity levels; seasonality	4-5 year olds The sample of public pre-schools was a convenience sample. ***ELIGIBILITY:*** Eligible pre-schools could not previously have play equipment or other markings, outside of field markings, on their playgrounds. All parents signed a consent form to allow their child to participate. ***EXPOSURE/ PARTICIPATION:*** Not reported	***LEAD AGENCY:*** The research team was from Ghent University and HUBrussel. ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Research suggests that the provision of portable play equipment increases physical activity among preschoolers in the short term. ***REPLICATION/ADAPTATION:*** Not reported ***ADOPTION:*** Not reported ***IMPLEMENTATION:*** Playground markings consisted of a trail, a river with crossings, and a flower-shaped hopscotch. The markings were developed by the research team in cooperation with 3 pre-school teachers. The playground markings and sets of play equipment were provided to the intervention schools by the research team within 4 weeks after baseline data was collected. Within 1 week of implementation, the pre-school teachers spent 1 hour teaching children how to use the playground equipment. ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Within 3 weeks of implementation completion, a research team member performed a surprise visit during recess for an implementation check-in at all of the intervention schools.	***RESOURCES:*** 1. Playground markings 2. Play equipment (e.g., balls, rings, discs, bean bags, hoops, flags) at a total cost of $370 3. Research personnel ***FUNDING:*** Not reported ***STRATEGIES:*** Not applicable	***PHYSICAL ACTIVITY:*** 1. None of the interventions resulted in a significant increase or decrease in post-test activity engagement percentages or average activity levels. 2. By clustering the pupils into schools and performing multilevel model analyses a small to average amount of variance was able to be explained in all of the activity levels, except for the vigorous activity level (5.9%, $p=0.05$ for average activity levels; 22.2%, $p<0.01$ for sedentary activity; 3.1%, $p=0.18$ for vigorous activity; 8.8%, $p=0.01$ for moderate to vigorous activity).

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