

INTERVENTION TABLE 1

Child Care Food and Beverage Policies

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
United States						
Ward, Benjamin (2008); Benjamin, Ammerman (2007); Ammerman, Ward (2007) North Carolina	<p>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</p> <p>OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i> 1. Physical activity components</p> <p><i>Complex:</i> 1. Centers developed action plans to improve ≥ 3 target environmental changes. 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. 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.</p>	<p>DESIGN: (Delayed) Group randomized trial</p> <p>DURATION: 6 months</p> <p>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)</p> <p>PRIMARY OUTCOME: Consumption of fruit, vegetables and reduced fat milk; physical activity</p> <p>MEASURES: 1. Nutrition and Physical Activity Self-Assessment for Child Care (current nutrition/physical activity policies and practices) 2. Environment and Policy Assessment and Observation (EPAO) – 75 items on nutrition/physical activity environments, policies, and practices</p> <p>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 (one-day observation of documents). Observers were trained by a 1-day workshop (review of EPAO, mock observation).</p> <p>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</p>	<p>3-5 year olds</p> <p>60% Non-White, 40% White (intervention)</p> <p>65% Non-White, 35% White (control)</p> <p>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)</p> <p>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.</p>	<p>LEAD AGENCY: Research team</p> <p>THEORY/Framework: Social cognitive theory</p> <p>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.</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>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. CCHCs 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.</p> <p>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.</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: 1. Resources for continuing education workshops 2. Funds for CCHC trainings 3. Collaborative action planning and technical assistance materials 4. NAP SACC tool kit</p> <p>FUNDING: Centers for Disease Control and Prevention; the North Carolina Department of Health and Human Services, Division of Public Health</p> <p>STRATEGIES: 9 additional states are using the NAP SACC program to address childhood overweight</p>	<p>NUTRITION: 1. Intervention centers had an 11% improvement in the EPAO score regarding total nutrition from baseline to follow-up (in ITT analysis) and no change was observed in the control centers; non-significant, p=0.06. 2. 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; from 9.0, SD=1.8 to 9.0, SD=1.7 in the control group). 3. 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).</p> <p>PHYSICAL ACTIVITY: 4. 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. 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) (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). 5. For individual-item analysis, intervention centers had a mean change score of +3.6 for physical activity items, whereas control was -0.2 (p<0.05).</p>

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 policy including a healthy snack and physical activity OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i> 1. Physical activity component (5 days/week for 3 school years for 120 minutes) with 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) <i>Complex:</i> 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. <i>(continued next page)</i>	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: <i>Year 1: Intervention subjects met the 40% inclusion criteria for analysis</i> 1. The intervention group (n=182) showed a relative reduction in percentage of body fat [%BF] ($\Delta = -0.76$, 95% CI; -1.42, -0.09, $p=0.027$), a greater relative gain in bone mineral density ($\Delta = 0.008$, 95% CI; 0.001, 0.005, $p=0.023$), and a greater relative reduction in heart rate response to the step test ($\Delta = -4.4$, 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, $p=0.39$; $F(1, 246) = 12.8$, $p=0.0004$) 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, $p=0.24$; $F(1, 246) = 5.9$, $p=0.016$) 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, $p=0.25$; 20-39% = -1.7, $p=0.27$; 40-59% = -3.3, $p=2.4$; 60-79% = -7.8, $p=2.4$; ≥80% = -6.3, $p=2.7$; $F(1, 246) = 4.8$, $p=0.029$). 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] ($F(1,246) = 4.8$, $p=0.029$) were observed with higher program attendance. 7. The relations between the changes in %BF ($F(1,246) = 12.8$, $p=0.0004$), BMD ($F(1,246) = 4.8$, $p=0.029$), cardiovascular fitness [CVF] ($F(1,246) = 4.8$, $p=0.029$) and attendance rate are also influenced by program attendance. <i>Year 3:</i> 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 ($p<0.05$). <i>(continued next page)</i>

(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
Barbeau, Johnson (2007) Georgia	<p>After school intervention providing a healthy snack and 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)</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: 1. Physical activity component</p> <p>Complex: 1. Parents and children attended information sessions. 2. Prizes given weekly for good behavior and attitude.</p>	<p>DESIGN: Randomized trial</p> <p>DURATION: 10 months</p> <p>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.</p> <p>PRIMARY OUTCOME: Overweight/obesity and moderate-to-vigorous physical activity (MVPA)</p> <p>MEASURES:</p> <ol style="list-style-type: none"> 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) <p>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.</p> <p>LIMITATIONS: Because children were growing, the capability to show changes like in waist circumference may have decreased</p>	<p>African American, Females, 8-12 years old (target sample)</p> <p>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.</p> <p>EXPOSURE/ PARTICIPATION: 278 children attended after-school sessions</p>	<p>LEAD AGENCY: Researchers were from the Georgia Prevention Institute at the Medical College of Georgia.</p> <p>THEORY/ FRAMEWORK: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>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.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> 1. Intervention manual 2. Weekly prizes 3. Healthy snacks 4. Teachers and assistants to lead activities <p>FUNDING: National Institutes of Health</p> <p>STRATEGIES: Not reported</p>	<p>OVERWEIGHT/OBESITY:</p> <ol style="list-style-type: none"> 1. Compared with the control group, the intervention group had a relative decrease in adiposity, including %BF (body fat) ($\Delta = -2.01$, 95% CI: -2.98, -1.04), and a relative increase in BMC (bone mineral content) ($\Delta = 0.044$, 95% CI: 0.024, 0.064), and BMD (bone mineral density) ($\Delta = 0.020$, 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 ($b = -0.225$, $p < 0.01$), while attendance was only marginally associated ($b = -0.076$, $p = 0.07$), this was also seen with BMD, where higher heart rates were associated with greater increases in BMD ($B = 0.001$, $p < 0.05$) and attendance was only marginally associated ($b < 0.001$, $p = 0.09$). 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 ($\Delta = -14.6$, 95% CI: -24.2, -5.1, $p = 0.003$). <p>PHYSICAL ACTIVITY:</p> <ol style="list-style-type: none"> 7. The intervention group had a relative increase in moderate physical activity ($\Delta = 0.21$, 95% CI: 0.07, 0.34, $p = 0.004$), vigorous physical activity ($\Delta = 0.15$, 95% CI: -0.01, 0.31, $p = 0.067$), and cardiovascular fitness ($\Delta = 1.57$, 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
<p>Kelder, Hoelscher (2005) Texas</p>	<p>CATCH Kids Club (CKC) – After school program requiring a snack component once a week that children helped to prepare and daily physical activity</p> <p>OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i></p> <ol style="list-style-type: none"> Physical activity component 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). <p><i>Complex:</i></p> <ol style="list-style-type: none"> Program implementers were given a CKC physical activity box with a variety of activities appropriate for children in grades K-5. 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. Children discussed the snack's taste and composition 	<p>DESIGN: Non-randomized trial DURATION: 5 months</p> <p>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.</p> <p>PRIMARY OUTCOMES: Physical activity (PA) and dietary intake</p> <p>MEASURES:</p> <ol style="list-style-type: none"> System for Observing Fitness Instruction Time (SOFIT) (total lesson length, time spent at various activity levels, lesson contexts). After-School Student Questionnaire (ASSQ) (food preferences, dietary knowledge, self-efficacy, intentions to choose healthful foods, participation in sedentary and sports activities) Focus Groups (strengths and weaknesses of the program, intentions to continue using the program, perceptions of student learning and enjoyment) <p>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.</p> <p>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</p>	<p>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)</p> <p>The results of the physical education component alone suggest it is feasible, effective and ready for larger scale evaluation or dissemination (potential reach).</p> <p>ELIGIBILITY: Children were excluded if they were in the kindergarten to 2nd grade because of the children's early level of cognitive development.</p> <p>EXPOSURE/ PARTICIPATION: In El Paso, all children received the 3 program components. In Austin, children received only the physical activity component.</p>	<p>LEAD AGENCY: The research team was from University of Texas-Houston.</p> <p>THEORY/ FRAMEWORK: Social cognitive theory</p> <p>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.</p> <p>REPLICATION/ADAPTATION: Adapted CATCH for an after-school setting.</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: The University of Texas- Houston research team distributed the intervention materials and conducted staff training. After-school staff was 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.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Weekly site visits to intervention sites (implementation progress, insurance of quality control, provision of assistance)</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> Education lesson binder Physical activity boxes Resources for after-school staff training Resources for snack lessons Education program guide Physical education equipment <p>FUNDING: Paso del Norte Health Foundation and the International Life Sciences Institute</p> <p>STRATEGIES: Not reported</p>	<p>PHYSICAL ACTIVITY:</p> <ol style="list-style-type: none"> 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. The overall time spent in MVPA at post-test was 56.8% at intervention sites and 31.3% at control sites (p=0.001). 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). Large reductions in standing (-26% intervention effect, p=0.027) and sitting (-22% intervention effect, p=0.125) were observed. <p>EATING BEHAVIOR:</p> <ol style="list-style-type: none"> No significant effects on eating behavior were found (small sample size for ASSQ).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Williams, Squillace (1998); Williams, Strobino (2004); Williams, Bollella (2002); Bollella, Spark (1999); Bollella, Boccia (1999); Spark, Pfau (1998); D'Agostino, D'Andrea (1999) New York	<p>Healthy Start Intervention-Nutrition policies in Head Start Centers required a meal/ snack plan providing a total fat level of $\leq 30\%$ of total energy and a saturated fatty acid level of $\leq 10\%$ of total energy over a 5-day period</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported</p> <p>Complex: 1. 15-minute nutrition education lessons, three times a week for 30 weeks (poems, stories, songs, games, creative play, role playing, explorative investigations, take home activities) 2. Parents received home activities, newsletters, health information 3. Parent meetings were held 3-4 times a year on health topics.</p>	<p>DESIGN: Non-randomized trial</p> <p>DURATION: > 24 months</p> <p>SAMPLE SIZE: 1296 children from 9 Head Start Centers</p> <p>PRIMARY OUTCOME: Dietary consumption of saturated and total fat</p> <p>MEASURES:</p> <ol style="list-style-type: none"> 36- item knowledge questionnaire for children (health, safety, nutrition). Test/retest reliability established. Menu Assessment (nutrient content, changes in menu patterns, vendor products) Meal observations (amount of foods served to children, amount of foods given away, traded, discarded, left on the table) Telephone parental diet recall (children's dietary intake) Physiologic Measures (cholesterol, physical growth, anthropometry) <p>DATA COLLECTION: The knowledge questionnaire was given prior to and at the end of each year by the Healthy Start team. One week of menus was collected semi-annually at each center and analyzed using modified protocol from the CATCH study. Meal observers watched 3 or 4 children at a time each year in the fall and spring. Physiologic measures were taken semi-annually by health professionals.</p> <p>LIMITATIONS: Parents recorded child eating habits; intervention conducted over a relatively short time period (difficult to predict outcome measures)</p>	<p>2-5 year olds</p> <p>100% lower-income</p> <p>42.6% non-Latino Black; 31.6% Latino; 22.9% non-Latino White; 1.4% Asian and 2.2% Other ethnicities (evaluation sample)</p> <p>ELIGIBILITY: Head Start Centers were invited to participate based on distance from the Child Health Center, ethnic diversity, food service's potential for intervention, and commitment to following the Healthy Start intervention. Parental consent was required.</p> <p>EXPOSURE/PARTICIPATION: All children who were enrolled at the Head Start centers were exposed to the intervention.</p>	<p>LEAD AGENCY: Head Start staff, Health and childhood specialists (intervention); Research team (evaluation)</p> <p>THEORY/Framework: Piaget's first 2 stages of intellectual development, social learning theory and the high/scope theory of active learning</p> <p>EVIDENCE-BASED: The study applies principles from comprehensive food service and health education interventions focused on older children, to younger children.</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: A series of meetings were held with the Head Start staff and parents prior to the intervention to share the aims and goals of the program and develop a broad base of support.</p> <p>IMPLEMENTATION: Centers were assigned to 1 of 3 interventions: food service and supplemental nutrition education, food service only, and control which received curriculum on accident prevention, safety, and general health. The curriculum was written by health professionals, early childhood specialists, and experts in health behavior in minority populations so that it was developmentally-appropriate and culturally-sensitive. Head Start teachers implemented the curriculum and Head Start cooks made changes to the food service. Dietitians conducted teacher (workshop) and food service staff (1 day, 6 hr) training sessions.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Curriculum checklist (program implementation); classroom observations (implementation of the units, children's response, teachers' performance); food service guideline checklist (monthly visits by dietitian to monitor food modifications)</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> Dietitians Teachers to implement curriculum Materials for education sessions (e.g., poems, games, stories) Training materials Healthy Start curriculum <p>FUNDING: National Heart, Lung and Blood Institute</p> <p>STRATEGIES: Not reported</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> Total energy intake increased in both groups (not significant), while caloric consumption increased in the intervention schools and decreased in control schools (not significant). Consumption of saturated fat from school meals decreased from 11.0%E (SD=4.7) to 8.0%E (SD=2.8) in intervention schools, compared with an increase from 10.2%E (SD=5.3) to 11.4%E (SD=5.7) for controls. Energy intake from total fat decreased from 29.2%E (SD=8.9) to 26.4%E (SD=7.9) in intervention schools, compared with an increase from 24.8%E (SD=11.1) to 29.1%E (SD=9.7). Differences in consumption between intervention and control from baseline to year 2 was significant for grams of saturated fat (mean change for intervention: 0.26, control: 2.82; $p<0.01$), %E from total fat (intervention: -4.45, control: 6.47; $p<0.001$) %E from saturated fat (intervention: -3.14, control: 2.01; $p<0.001$), iron (intervention: 0.77, control: -0.76; $p<0.05$) and magnesium (intervention: 18.73, control: 6.44; $p<0.05$), with all changes favoring the intervention group. All-day children consumed less energy, protein, carbohydrate, total fat, calcium and magnesium than AM and PM children (data not shown) <p>ENVIRONMENT CHANGE:</p> <ol style="list-style-type: none"> Significant decrease in % of kcal from saturated fat in the intervention schools menus (12.5% energy [%E] to 8.0%E, $p<0.001$) compared to controls (12.1%E to 11.6%E). % of kcal from total fat in the menus significantly decreased in intervention (31.0%E to 25.0%E, $p<0.01$) compared to control (29.9%E to >28.4%E). <p>OTHER:</p> <ol style="list-style-type: none"> There was a decrease in total serum cholesterol levels in the intervention compared to controls (mean difference= 5.6, $p<0.05$).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Slawta, Bentley (2008) Oregon	<p>Be a Fit Kid – after school program designed to provide healthful foods and physical activity opportunities for children</p> <p>OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i> 1. Physical activity component emphasized cardiovascular fitness</p> <p><i>Complex:</i> 1. Nutrition component provided education on current dietary guidelines and sampling of fruits and vegetables, foods containing unsaturated fats and whole grains. 2. Fieldtrips to supermarkets 3. Parent component: Initiation lecture was held prior to start of program covering nutrition and physical activity principles.</p>	<p>DESIGN: Before and after study DURATION: 12 weeks SAMPLE SIZE: 75 students from 4 elementary schools PRIMARY OUTCOME: Overweight/obesity; dietary consumption of fruits, vegetables and whole grains; and physical activity MEASURES: 1. Timed mile run and number of sit-ups in 60 seconds (fitness) 2. Nutrition test (nutrition knowledge) 3. 24-hour food log filled out by parents (diet composition) 4. Parental questionnaire (changes in child eating habits) 5. Physiology (height, weight, triceps, subscapular, and calf skinfold thickness) 6. Venipuncture: lipids and lipoproteins</p> <p>DATA COLLECTION: The timed mile run and number of sit-ups in 60 seconds were administered before and after the intervention. Parents were asked to fill out 24-hour food logs for their children. 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 to determine the extent positive dietary and physical activity habits were maintained. Body weight and height were measured 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.</p> <p>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</p>	6-12 year olds ELIGIBILITY: Not reported EXPOSURE/PARTICIPATION: Not reported	<p>LEAD AGENCY: Research team THEORY/Framework: PRECEED-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 for 12 weeks. The physical activity 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 diet rich in fruits and vegetables, unsaturated fats, and whole grains. Nutrition packets were sent home weekly to parents with raffles for children returning signed form 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 PRECEED-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</p>	<p>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.</p>	<p>OVERWEIGHT/OBESITY: 1. Significant improvements were observed in all body composition measures. The mean BMI pre-intervention for students was 21 ± 5, and post-intervention was 20 ± 5 ($p < 0.001$). NUTRITION: 2. Significant improvements were observed in some dietary habits from pre- to post-intervention: total fat (as % of total calories) – 33% to 26% ($p < 0.001$); saturated fat (as % of total calories) – 12% to 8% ($p < 0.001$); mono-unsaturated fat (as % of total calories) – 10% to 8% ($p = 0.009$) 3. 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). 4. 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). PHYSICAL ACTIVITY: 5. Significant improvements were observed in all fitness measures from pre- to post-intervention: Mile-run – 13:33 minutes to 10:34 minutes ($p < 0.001$); Sit-ups – 23 to 30 ($p < 0.001$). 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. OTHER: 6. There were significant reductions in high density lipoprotein cholesterol from pre- to post-intervention (from 1.2 ± 0.1 to 1.2 ± 0.3, $p = 0.015$). MAINTENANCE: 7. Positive changes made in dietary habits were maintained by the majority of children 6 months following the intervention (data not reported).</p>

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Rinderknecht, Smith (2004) Minnesota	<p>Modifications made to after school dinner menus (provide lower fat, higher fruit and vegetable meals; replace soda with water and juice)</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported</p> <p>Complex: 1. Education curriculum: Lessons focused on promoting physical activity, choosing fruits instead of candy, drinking water or juice instead of soda, choosing low-fat foods and reviewing ways to stay in balance.</p>	<p>DESIGN: Before and after study</p> <p>DURATION: 7 months</p> <p>SAMPLE SIZE: 104 adolescents (41 excluded from analysis)</p> <p>PRIMARY OUTCOME: Dietary consumption of fat and sugar</p> <p>MEASURES:</p> <ol style="list-style-type: none"> 1. Height and weight (body mass index [BMI]) 2. Self-efficacy questionnaires: self-efficacy was assessed through the development and validation of two age-appropriate questionnaires. 3. 24-hour recalls (dietary intake) <p>DATA COLLECTION: Height and weight was measured in all youth pre- and post-intervention. Youth also completed the self-efficacy questionnaire before and after the intervention. Youth completed 24 hour recalls and were asked to report the amount, preparation techniques and specific brands of all foods consumed the previous day. To increase the accuracy of portion size estimations, plastic food models and measuring cups and spoons were used. The Esha food processor software was used to determine the content of the food and the number of food guide pyramid servings of fat and sugar.</p> <p>LIMITATIONS: Use of a before-after design and the lack of a control group; intervention had to fit within the context of the current ongoing programming of the after school program; results may not be generalized to other youth populations because the project served as a convenience sample of young and adolescent urban Native American youth who had self selected to attend an after school program; results are constrained by the small sample size and low statistical power; high attrition rate over the 9-month intervention (32%); reliable dietary information was not available for 5-10 year old children</p>	<p>Urban</p> <p>100% Native American</p> <p>5-10 year olds</p> <p>11-18 year olds</p> <p>ELIGIBILITY: Must complete a parental consent form, have 75% attendance in classes, provide pre- and post-data</p> <p>EXPOSURE/PARTICIPATION: All of the after-school participants were potentially exposed to the menu changes. 154 participants were exposed to at least some of the intervention classes (only 104 completed at least three quarters of the classes and the pre- and post-intervention surveys).</p>	<p>LEAD AGENCY: The research team (intervention and evaluation) and school program staff (intervention)</p> <p>THEORY/Framework: Social Cognitive Theory</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: The research team developed the intervention with the after-school program staff. Menu modifications were made by the program staff to after-school dinner menus. Researchers taught one 30- to 60-minute monthly lesson to each of two age groups. Researchers and after-school staff were on-site weekly to review lessons and provide verbal reinforcements to the youth.</p> <p>FORMATIVE EVALUATION: Researchers attended after-school program activities for several months prior to implementing the intervention to learn about the structure and capacity of the after-school program, to build trust, and to work collaboratively with the staff to design appropriate lessons.</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> 1. Funds to make menu modifications 2. Materials for education lessons 3. Personnel to teach the lessons <p>FUNDING: This study was funded by the Agricultural Experiment Station of the University of Minnesota and the United way.</p> <p>STRATEGIES: Not reported</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> 1. For 11-18 year old adolescents, a significant increase ($p=0.027$) in fat and sugar consumption was identified from baseline (mean 28.02; $SD=28.27$) to post intervention (mean 37.65, $SD=28.7$) 2. Multiple comparisons showed that 11-18 year old boys significantly increased their intake of fat and sugar ($p<0.006$): baseline (mean 22.90; $SD=18.47$) to post-intervention (mean 39.85, $SD=22.45$). 3. Accurate data regarding dietary behaviors (from the 24 hour recalls) among 5-10 year olds was not available. <p>SELF-EFFICACY:</p> <ol style="list-style-type: none"> 4. The 5-10 year old children reported a significant improvement in self-efficacy (for all children- mean at baseline: 2.09 ± 0.51, mean at post-intervention: 2.34 ± 0.41; $p=0.002$). 5. Overweight 5-10 year olds significantly improved their self-efficacy (mean at baseline: 2.07 ± 0.54, mean at post-intervention: 2.37 ± 0.38; $p=0.013$), whereas no significant improvements were demonstrated by the youth at risk for overweight or normal weight youth. 6. The nutrition intervention was not successful in significantly improving dietary self efficacy among adolescents, regardless of gender or BMI status.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Cassady, Vogt (2006) California	<p>Students Today Achieving Results for Tomorrow (START) implemented a policy change to increase the number of servings of fruits and vegetables on after-school program snack menus</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported</p> <p>Complex: 1. Children's 5 a Day – Power Play! Curriculum</p>	<p>DESIGN: Before and after study</p> <p>DURATION: 2 years</p> <p>SAMPLE SIZE: Estimated population size = 8,000 from 44 public elementary schools in the greater Sacramento, CA area.</p> <p>PRIMARY OUTCOME: Menu offerings of fruits and vegetables</p> <p>MEASURES: 1. Observation of snack menus</p> <p>DATA COLLECTION: The authors assessed the outcome of the policy change by observing changes in the snack menus. The Nutritionist V software program was used to estimate selected nutrient values; the values were then averaged for each week.</p> <p>LIMITATIONS: Not reported</p>	<p>Lower income 5-10 year olds</p> <p>33% African American; 26% Hispanic; 25% Asian American; 14% White and 2% Other race/ethnicity (START participant demographics)</p> <p>START is offered only at public elementary schools where a high proportion of families qualify for free or reduced-price school meals.</p> <p>ELIGIBILITY: Not reported</p> <p>EXPOSURE/PARTICIPATION: All children attending the START after-school program were exposed to the intervention.</p>	<p>LEAD AGENCY: The START after-school program personnel from the city of Sacramento Parks and Recreation Department (implemented the policy change) and the research team (evaluation)</p> <p>THEORY/Framework: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: START administrators implemented the Children's 5 a Day - Power Play! Curriculum, which teaches children to eat at least 5 servings of fruits and vegetables per day. A policy change was adopted the following year to increase the servings of fruits and vegetables on the snack menus of after-school programs.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: 1. Funds for additional fruits and vegetables 2. After-school staff 3. Materials for education classes</p> <p>FUNDING: California Department of Health Services</p> <p>STRATEGIES: START administrators were in the process of developing a plan to source fresh fruits and vegetables from local growers.</p>	<p>ENVIRONMENT CHANGE:</p> <ol style="list-style-type: none"> 1. Average fruit (juice and fresh fruit) servings on the snack menu increased by 83% from baseline to follow-up ($p < 0.05$). 2. Grams of saturated fat on the snack menu decreased by an average of 42% from baseline to follow-up (not significant). 3. There was no change in servings of vegetables on the snack menu. 4. Milk declined from 0.29 average daily servings on the snack menu to 0. As a result, the new snack menu items contained significantly less calcium and Vitamin A. Calcium decreased by 67% ($p < 0.05$) from baseline to follow-up and vitamin A decreased by 79% ($p < 0.05$).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
International						
Korwanich, Sheiham (2008) Thailand	<p>Nutritional guidelines on snacks and beverages in pre-schools</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported</p> <p>Complex:</p> <ol style="list-style-type: none"> 1. Encouraged nutrition education in school curriculum through songs, tales, etc. 2. School newsletters and village communications to inform parents, teachers and school board members about the policy 	<p>DESIGN: Group randomized trial</p> <p>DURATION: 9 months</p> <p>SAMPLE SIZE: 219 pre-school children (135 intervention, 84 control) from 16 schools</p> <p>PRIMARY OUTCOME: Dietary consumption of cariogenic snacks, Thai desserts, crispy snacks and sugary drinks</p> <p>MEASURES:</p> <ol style="list-style-type: none"> 1. Direct observation (dietary intake) 2. Observation ("rubbish bag") <p>DATA COLLECTION: Direct observation of dietary intake was collected over three days at baseline and completion of the intervention. All food and beverages consumed by the children were recorded by trained observers during school time, but the focus was on food and beverages consumed at break time. Consumption was also assessed using the modified "rubbish bag" method: all children collected the wrappings of their snack intake during each of the 3 days. Snacks and mean frequencies of the observed daily intake were calculated and divided into 4 categories: cariogenic snacks (e.g., sweets, confectionery, peanuts with coated flavors) Thai desserts, crispy snacks (e.g., potato chips, instant noodles) and sugary drinks.</p> <p>LIMITATIONS: Quasi-experimental study because all factors affecting eating behaviors could not be controlled; independent government-led health promotion projects and advertising began during the intervention period to discourage children from eating sweets (reached both intervention and control)</p>	<p>4-5 year olds</p> <p>ELIGIBILITY: Children who moved or were absent during the study were excluded.</p> <p>EXPOSURE/PARTICIPATION: 234 pre-school children from 16 schools received the intervention. Of the 234 children invited to participate in the study no one refused to participate.</p>	<p>LEAD AGENCY: The research team</p> <p>THEORY/Framework: Not reported</p> <p>EVIDENCE-BASED: The study builds on previous school-based policy interventions to improve eating behaviors among children.</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: The healthy eating policy was developed with active participation from school board members, teachers and parents and included 4 steps: policy selection, policy advocacy, policy adoption and policy implementation. The research team worked with parents, teachers and school board members to develop the policy and the schools were responsible for implementation of the policy.</p> <p>FORMATIVE EVALUATION: Focus groups were conducted with parents, school board members and teachers to develop a healthy eating policy.</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> 1. Newsletters, media coverage and posters to promote the policy 2. Materials for nutrition education 3. Personnel to implement the school healthy eating policy and implement curriculum <p>FUNDING: The Thai Health Promotion Organization</p> <p>STRATEGIES: Not reported</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> 1. There were significant differences between frequencies of cariogenic snack eating in both control and intervention schools from baseline to 9 month evaluation. Intake frequencies increased from 1.03 ± 0.73 to 1.39 ± 0.86 times per day in controls, but decreased from 1.12 ± 0.79 to 0.84 ± 0.58 times per day in the intervention group ($p < 0.05$). 2. At 9 month evaluation, the mean frequencies of intake per day increased significantly in the control group for crispy snacks (0.67 ± 0.57 to 1.10 ± 0.57; $p < 0.05$) and for non-sugar milk intake (0.98 ± 0.11 to 1.0 ± 0.16; $p < 0.05$). 3. Intake of desserts (from 0.23 ± 0.40 to 0.13 ± 0.20) crispy snacks (from 0.91 ± 0.77 to 0.68 ± 0.44), fresh fruits (from 0.10 ± 0.20 to 0.07 ± 0.17) and sugary drinks (from 0.31 ± 0.41 to 0.23 ± 0.37) decreased significantly in intervention schools from baseline to evaluation ($p < 0.05$). 4. Non-sugar milk frequencies were not significantly different between baseline and 9 month evaluation in the intervention group. 5. At evaluation, mean daily intakes of fresh fruits, non sugar milk and sugary drinks in the control and intervention group were similar, except for cariogenic snacks and crispy snacks intake, which were significantly lower ($p < 0.05$) in the intervention schools compared to control. However, the frequency of intake of Thai desserts was significantly higher in the intervention than in control schools.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Vereecken, Huybrechts (2008); Huybrechts, Matthys (2008) Belgium	<p>Availability of pre-school food policies</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component Not reported</p> <p>Complex Not reported</p>	<p>DESIGN: Cross-sectional study</p> <p>DURATION: Not applicable</p> <p>SAMPLE SIZE: 1678 children from 43 schools</p> <p>PRIMARY OUTCOME: Dietary consumption of water, snacks, sugared soft drinks, milk, fruit juice, sugared milk drinks and fruit</p> <p>MEASURES:</p> <ol style="list-style-type: none"> 1. Questionnaire with principals [availability of lunches at school (e.g. possibility of hot lunches at school), snacks/drinks distributed at school, vending machines in school, nutrition education, nutrition campaigns recently held at school and food rules] 2. Parent questionnaire (socio-demographic and lifestyle characteristics) 3. Food frequency questionnaire (FFQ) completed by parent or guardian (average consumption of 47 food groups during the past year, portion sizes of food consumed). 4. 3-day estimated diet record (EDR) completed by parent or guardian [information about consumed food products (brand name, type of fruit, type of fat used, etc), recipes, recipe ingredients, cooking methods] 5. Teacher and staff food records <p>DATA COLLECTION: Data were collected in autumn and winter 2002-2003. During interviews with principals, a questionnaire was given which collected information on school nutrition policies. Parents were asked by letter to complete a general questionnaire, FFQ and 3-day EDR (EDR only distributed to those who completed FFQ). Lunch room staff were asked to provide a record of foods children consumed during lunch while teachers recorded snack foods consumed by children. This information was given to the parents to include in the EDR. Average energy intake and nutrient intakes were calculated as the mean of the 3 recorded days.</p> <p>LIMITATIONS: Self- and parent-reported data; the FFQ tended to underestimate actual daily calcium intakes in preschool children when recorded by the parents; results from EDR may not represent usual food intake; parents participating in the study were less likely to smoke and more likely to have a higher education than non-participants; potential selection bias for the EDR as students taking a hot meal lunch were excluded more frequently than records from other children</p>	<p>2.5 - 6.5 year olds</p> <p>Children in the study were demographically representative of the target population of Flemish pre-school children.</p> <p>ELIGIBILITY: Children were excluded if they stayed at an institution where the food was provided by the institution, they did not attend school during the whole study, they lived abroad but attended school in Flanders, neither of their parents spoke Dutch or they had an older brother or sister participating in the study.</p> <p>EXPOSURE/PARTICIPATION: Not applicable</p>	<p>LEAD AGENCY: The research team from Ghent University</p> <p>THEORY/ FRAMEWORK: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not applicable</p> <p>ADOPTION: Not applicable</p> <p>IMPLEMENTATION: Not applicable</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: Not applicable</p> <p>FUNDING: The Belgian Nutrition Information Center provided funding for the survey. One researcher was funded by the Research Foundation-Flanders (FWO-Flanders).</p> <p>STRATEGIES: Not applicable</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> 1. Pre-school policies did not influence the consumption of water, snacks, sugared soft drinks and milk, while pre-school policies did influence the consumption of fruit juice, sugared milk drinks and fruit beyond individual characteristics of the children. However, the percentage of total variance attributable to schools was limited: 7.4% for fruit juice, 3.6% for sugared milk drinks and 4.4% for fruit. 2. Food rules regarding snack consumption was associated with an increase in the consumption of fruit ($\Delta=21$, standard error=8; $p<0.05$). 3. Availability of sugared milk drinks decreased the consumption of milk ($\Delta=-29$, standard error=13; $p<0.05$) and increased the consumption of sugared milk drinks ($\Delta=25$, standard error=13; $p=0.05$). Children in schools that provided sugared milk drinks during morning and afternoon breaks consumed more sugared milk drinks.

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