

Meal Interventions and Fruit and Vegetable Snack Interventions to Increase Availability of Healthier Foods and Beverages Provided by Schools

Summary Evidence Table

Abbreviations Used in This Document:

- Intervention components
 - FFVP: fresh fruit and vegetable program
 - FRPL: free and reduced price lunch
 - FVMM: fruit and vegetables make the marks
 - SBP: school breakfast program
- Outcomes:
 - F&V: fruit and vegetables
 - SSB: sugar sweetened beverage
- Measurement terms
 - BMI: body mass index
 - CI: confidence interval
 - cm: centimeter
 - d: day
 - EDMP: energy dense, micronutrient poor
 - g: grams
 - kcal: kilocalories
 - kJ: kiloJoules
 - mmHg: millimeters of mercury
 - mmol/L: millimoles per liter
 - oz: ounces
 - pct pts: percentage points
 - serv: servings
- Study design
 - Group RCT: group randomized trial
 - RCT: randomized trial
- Other terms:
 - NA: not applicable
 - NR: not reported
 - NS: not significant
 - SES: socioeconomic status

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
<p>Author, Year: Affenito, 2013</p> <p>Study Design: post only with comparison</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Study population: elementary, middle, and high school youth</p> <p>Sample size: 2,298</p> <p>Demographics: <u>Intervention</u> Mean age: 10.6 years Gender: 41.5% female Race/ethnicity: 38.2% White, 29.7% Black, 5.9% other, 26.1% Hispanic SES: NR</p> <p><u>Control</u> Mean age: 12.0 years Gender: 52.5% female Race/ethnicity: 57.0% White, 14.3% Black, 6.7% other, 21.8% Hispanic SES: NR</p>	<p>Location (urbanicity): nationwide US (mixed)</p> <p>Intervention activities: school breakfast policy</p> <p>School Breakfast Program was established in 1966 and is designed to help serve breakfasts to children attending schools in underprivileged and remote areas.</p> <p>Comparison: did not participate in school breakfast program</p> <p>Study Period: 2004-2005</p>	<p>Total Energy Intake (kcal/d) Intervention: 2226.0 kcal/d Control: 2064.1 kcal/d Summary Effect: 161.9 kcal/d</p> <p>BMIz Intervention: 0.75 Control: 0.73 Summary Effect: 0.02</p> <p>Overweight/Obesity Prevalence Combined Intervention: 40.6% Control: 39.5% Summary Effect: 1.2 pct pts</p> <p>Paper conclusions: School breakfast offers children the opportunity for improved nutrient intake and healthier body weight through consumption of breakfast.</p>
<p>Author, Year: Amin, 2015</p> <p>Study Design: repeat cross sectional</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: 3rd-5th grade students</p> <p>Sample size: 1st: 498; 2nd: 944</p> <p>Demographics: Mean age: 3rd-5th grade Gender: NR Race/ethnicity: 84%-90% white SES: 40%-60% of children qualified for free or reduced lunch</p>	<p>Location (urbanicity): northeastern US, probably Vermont</p> <p>Intervention activities: As of the 2012 school year, the U.S. Department of Agriculture (USDA) requires schoolchildren to select either a fruit or a vegetable with a reimbursable meal.</p> <p>Comparison: NA</p> <p>Study Period: 2012-2013</p>	<p>Fruit and Vegetable intake -0.06 cups/lunch; p=0.01</p> <p>Paper conclusions: Children consumed fewer FVs and wasted more FVs during the school year immediately following implementation of the USDA rule that required them to take one fruit or vegetable at lunch.</p>
<p>Author, Year: Bere, 2005</p> <p>Study Design: RCT</p> <p>Suitability of Design: Greatest</p>	<p>Study population: 7th grade students</p> <p>Sample size: 795</p> <p>Demographics: Mean age: 12.3 years Gender: 50.1% female</p>	<p>Location (urbanicity): Hedmark and Telemark counties, Norway (NR)</p> <p>Intervention activities: <u>Arm 1 (Free Fruit):</u> fruit and vegetable program</p>	<p>Fruit and vegetable intake (portion/day) <u>Arm 1 (Free Fruit)</u> Intervention: baseline: 2.0 portion/d follow-up: 2.0 portion/d Control: baseline: 2.0 portion/d follow-up: 1.0 portion/d</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
<p>Quality of Execution: Good</p>	<p>Race/ethnicity: NR SES: NR</p>	<p>The Norwegian School Fruit Program is a national program in which all elementary schools are offered to participate. Students who subscribe receive a free piece of fruit or a carrot each school day.</p> <p><u>Arm 2 (FVMM):</u> fruit and vegetable program + nutrition education + taste tests</p> <p>Fruits and Vegetables Make the Marks (FVMM) consists of three components, a classroom curriculum that also includes taste tests of fruits and vegetables, parental involvement via newsletters, and the School Fruit Programme. The School Fruit Program is a national program in which all elementary schools are offered to participate. Students who subscribe (and pay) receive a piece of fruit or a carrot each school day.</p> <p>Comparison: schools not participating in the School Fruit Program</p> <p>Study Period: September 2001 – May 2003</p>	<p>Relative Percent Change: 50.0%</p> <p><u>Arm 2 (FVMM)</u> Intervention: baseline: 1.5 portion/d follow-up: 1.3 portion/d Control: baseline: 2.0 portion/d follow-up: 1.0 portion/d Relative Percent Change: 36.7%</p> <p>Soda/candy/chips (times/week) <u>Arm 1 (Free Fruit)</u> Low parental education: baseline: 7.3 times/wk follow-up: 7.0 times/wk Summary Effect: -0.3, p=0.16</p> <p>High parental education: baseline: 5.9 times/wk follow-up: 6.3 times/wk Summary Effect: 0.4, p=0.89</p> <p><u>Arm 2 (FVMM)</u> Low parental education: baseline: 8.2 times/wk follow-up: 8.6 times/wk Summary Effect: 0.4, p=0.71</p> <p>High parental education: baseline: 6.3 times/wk follow-up: 6.6 times/wk Summary Effect: 0.3, p=0.89</p> <p>Paper conclusions: Providing a piece of fruit or a vegetable at school for no cost is an effective strategy to increase school children’s intake of fruit and vegetables. These results indicate that free school fruit might prevent future excessive weight gain. Furthermore, it indicates that it takes time from intervention implementation to</p>

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			see effects on weight status, recognizing the importance of long-term follow-up intervention studies for obesity prevention.
<p>Author, Year: Bere, 2006a (FVMM)</p> <p>Study Design: Group RCT</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Good</p>	<p>Study population: 6th graders</p> <p>Sample size: 369 (190 intervention, 179 control)</p> <p>Demographics: Mean age: 11.3 years Gender: 54.0% female Race/ethnicity: NR SES: NR</p>	<p>Location (urbanicity): Telemark county, Norway (NR)</p> <p>Intervention activities: fruit and vegetable program + nutrition education + taste tests</p> <p>Fruits and Vegetables Make the Marks (FVMM) consists of three components, a classroom curriculum that also includes taste tests of fruits and vegetables, parental involvement via newsletters, and the School Fruit Programme. The School Fruit Program is a national program in which all elementary schools are offered to participate. Students who subscribe (and pay) receive a piece of fruit or a carrot each school day.</p> <p>Comparison: schools not participating in the School Fruit Program</p> <p>Study Period: September 2001 – May 2003</p>	<p>Servings of fruits and vegetables/day (serv/d)</p> <p>Intervention: baseline: 2.8 serv/d follow-up: 2.2 serv/d</p> <p>Control: baseline: 2.6 serv/d follow-up: 2.1 serv/d</p> <p>Relative Percent Change: -4.8%</p> <p>Paper conclusions: FVMM did not have an effect in increasing school children’s intake of fruits and vegetables.</p>
<p>Author, Year: Bere, 2006b (Free Fruit)</p> <p>Study Design: Group RCT</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Good</p>	<p>Study population: 6th graders</p> <p>Sample size: 517 (286 intervention, 231 control)</p> <p>Demographics: Mean age: 11.3 years Gender: 47.6% female Race/ethnicity: NR SES: NR</p>	<p>Location (urbanicity): Hedmark county, Norway (NR)</p> <p>Intervention activities: fruit and vegetable program</p> <p>The Norwegian School Fruit Program is a national program in which all elementary schools are offered to participate. Students who subscribe (and pay) receive a piece of fruit or a carrot each school day.</p>	<p>Servings of fruits and vegetables/day (serv/d)</p> <p>Intervention: baseline: 2.2 serv/d follow-up: 2.5 serv/d</p> <p>Control: baseline: 2.5 serv/d follow-up: 1.8 serv/d</p> <p>Relative Percent Change: 39.8%</p>

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Study	Population Characteristics	Intervention Characteristics	Results
		<p>Comparison: schools not participating in School Fruit Program</p> <p>Study Period: September 2001 – May 2003</p>	<p>Paper conclusions: Results show that intervention did not have an effect in increasing school children’s intake of fruit and vegetables.</p>
<p>Author, Year: Campos Pastor, 2012</p> <p>Study Design: before-after</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Study population: 12 and 16 year olds attending two randomly picked schools</p> <p>Sample size: 263</p> <p>Demographics: Mean age: 13.9 years Gender: 50.4% female Race/ethnicity: NR SES: NR Overweight/obese: male: 31.5% overweight, 7.9% obese; females 21.7% overweight, 4.7% obese</p>	<p>Location (urbanicity): Granada, Spain (NR)</p> <p>Intervention activities: school breakfast policy + nutrition education</p> <p>At school, students received daily breakfast, composed of a dairy product, fruits, cereals, nuts, and a sandwich with protein content. Nutrition classes were conducted throughout the school year directed at students, family members, and school teachers.</p> <p>Comparison: NA</p> <p>Study Period: 2009-2010 school year</p>	<p>Daily Energy Intake (kcal/d) Girls: baseline: 2465.8 kcal/d follow-up: 2107.7 kcal/d Relative Percent Change: -14.5%</p> <p>Boys: baseline: 2780.3 kcal/d follow-up: 2232.2 kcal/d Relative Percent Change: -19.7%</p> <p>Systolic BP (mmHg) Girls: baseline: 106.4 mmHg follow-up: 107.0 mmHg Summary Effect: 0.6%</p> <p>Boys: baseline: 108.1 mmHg follow-up: 109.0 mmHg Summary Effect:: 0.9%</p> <p>Diastolic BP (mmHg) Girls: baseline: 65.4 mmHg follow-up: 65.6 mmHg Summary Effect: 0.2</p> <p>Boys: baseline: 63.3 mmHg follow-up: 65.4 mmHg Summary Effect: 2.4</p> <p>Total cholesterol (mg/dL)</p>

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			<p>Girls: baseline: 169.8 mg/dL follow-up: 155.1 mg/dL Summary Effect: -14.7</p> <p>Boys: baseline: 151.6 follow-up: 145.0 Summary Effect: -6.6</p> <p>Overweight/Obesity Prevalence Combined Girls: baseline: 26.4% follow-up: 17.9% Summary Effect: -8.5 pct pts</p> <p>Boys: baseline: 39.5% follow-up: 26.78% Summary Effect: -12.7 pct pts</p> <p>Obesity Prevalence Girls: baseline: 4.7% follow-up: 3.9% Summary Effect: -0.8 pct pts</p> <p>Boys: baseline: 8.0% follow-up: 5.5% Summary Effect: -2.5 pct pts</p> <p>Paper conclusions: School-based nutritional intervention has a positive impact on food habits, anthropometric and body composition outcomes, and MS-related biochemical parameters of a population of adolescents in a southern Spanish city.</p>

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<p>Author, Year: Chang, 2014</p> <p>Study Design: cross sectional with comparison</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Study population: 6-12 yrs olds (elementary school)</p> <p>Sample size: n=2,017</p> <p>Demographics: <u>Intervention (school lunch)</u> Mean age: 8.45 yrs Gender: 47% female Race/ethnicity: NR study conducted in Taiwan SES: 6.20 (NT\$ 10000)</p> <p><u>Comparison (no school lunch)</u> Mean age: 8.53 yrs Gender: 42% female Race/ethnicity: NR study conducted in Taiwan SES: 5.97 (NT\$ 10,000)</p>	<p>Location (urbanicity): Taiwan</p> <p>Intervention activities: According to the Hygiene Law of the school lunch program in Taiwan, school lunches have to include rice, at least two kinds of vegetables, one type of meat and a bowl of soup. There are no specific regulations of nutrient intakes.</p> <p>Some schools prepare lunches in their on-site kitchens, other schools without food facilities order hot lunch boxes from large food serving companies or restaurants, and others do not offer school lunches.</p> <p>Comparison: no school lunch offered</p> <p>Study Period: post test 2002</p>	<p>Overweight (%) [they used Taiwan cutoff points] School kitchen: 24.2% Prepared at home: 26.1% Effect: -1.9 pct pts</p> <p>Paper conclusions: Children who go to schools which serve lunch meals prepared by school kitchens tend to have lower weight on average.</p>
<p>Author, Year: Cohen, 2012</p> <p>Study Design: Post-test only with comparison</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: middle school students (6th-8th grade)</p> <p>Sample size: 3,049</p> <p>Demographics: <u>Intervention</u> Mean age: 6th-8th grade Gender: NR Race/ethnicity: NR SES: eligible for free or reduced-price meals 88%</p> <p><u>Control</u> Mean age: 6th-8th grade Gender: NR Race/ethnicity: NR SES:</p>	<p>Location (urbanicity): Boston, MA (urban)</p> <p>Intervention activities: Project Bread hired a chef to develop recipes, plan menus, and train existing cafeteria staff to create healthier, more flavorful lunches. The chef worked with the staff 2 to 3 days/wk for 2 yrs; trainings included food-preparation techniques and recommendations on how to achieve the nutrition goals.</p> <p>The chef created new menus to improve the healthiness and palatability of all meal components (meals included entrees, grain-based sides, fruits, vegetables, and milk). The goals of the Chef Initiative were to replace trans and saturated fats with unsaturated fats, reduce added sugar and salt, and</p>	<p>Milk (percent consumed at lunch) Intervention: 77.2 Control: 73.5 Estimated effect: 3.7, p=0.38</p> <p>Fruit and Vegetable (number of servings consumed at lunch) Intervention: 1.01 Control: 0.80 Estimated effect: 0.21 (significant increase in vegetable consumption, but no significant increase in fruit consumption)</p> <p>Paper conclusions: This pilot study provides evidence that enhancements in school menu dietary quality and palatability can be achieved using a chef-based model. Overall, the selection and consumption of foods at Chef Initiative schools were similar to those of students in control schools. Students at Chef Initiative</p>

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	eligible for free or reduced-price meals 86%	<p>increase whole grains and fiber. These Chef Initiative guidelines included the following: eliminate trans fats, use low-fat cheese when available, eliminate whole and reduced-fat milk, cook with oils instead of butter, remove pastries, limit chocolate milk to two times per week, replace fruits canned in syrup with fresh or frozen fruit, serve fresh or frozen vegetables instead of canned, substitute refined grains with whole grains products when available, remove added salt from recipes, and serve lunches with at least 5 g fiber.</p> <p>Comparison: usual care, standard meals</p> <p>Study Period: 2007-2009</p>	schools ate more vegetables and took more whole grains. Despite limited availability of chocolate milk, milk consumption remained high.
<p>Author, Year: Cullen, 2015</p> <p>Study Design: repeat cross sectional</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: elementary school students</p> <p>Sample size: 1st 472, 2nd 573</p> <p>Demographics: Mean age: NR (k-5th grade students) Gender: about 50% female Race/ethnicity: White 49%; African-American 6%; Hispanic 34%; Other 11% SES: four low (49–79% FRP) and four middle income elementary schools (7–18% FRP)</p>	<p>Location (urbanicity): Houston, TX (urban, suburban)</p> <p>Intervention activities: investigated whether elementary student food selection and consumption changed after implementation of the new NSLP meal patterns.</p> <p>Comparison: usual care</p> <p>Study Period: spring 2011-spring 2013</p>	<p>Energy intake at lunch (kcal/lunch) Spring 2011: 500.5 Spring 2013: 497.36 Estimated effect: -3.17, NS</p> <p>Fruit at lunch (c/lunch) Spring 2011: 0.32 Spring 2013:0.38 Estimated effect: 0.06, NS</p> <p>Total vegetables at lunch (c/lunch) Spring 2011: 0.38 Spring 2013:0.35 Estimated effect: -0.03, NS</p> <p>100% fruit juice at lunch (c/lunch) Spring 2011: 0.43 Spring 2013: 0.46 Estimated effect: 0.03, NS</p> <p>milk at lunch (ozs/lunch) Spring 2011: 5.95</p>

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			<p>Spring 2013: 5.49 Estimated effect: -0.46, NS</p> <p>Paper conclusions: Students had similar consumption rates for fruit, whole grains, and most vegetables in this study.</p>
<p>Author, Year: Damsgaard, 2014</p> <p>Study Design: Group RCT</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Study population: 3rd and 4th grade students at 9 Danish schools</p> <p>Sample size: 823 at baseline</p> <p>Demographics: Mean age: 10.0 Gender: 48% female Race/ethnicity: NR SES: parental education: 41% shore education, 59% higher education Immigrant status: 12% immigrant/descendant, 88% non-immigrant Overweight/obese: 12% overweight, 2% obese</p>	<p>Location (urbanicity): Eastern part of Denmark (Zealand and Lolland-Falster) (NR)</p> <p>Intervention activities: school lunch policy + farm to school program + nutrition education + taste tests</p> <p>Optimal Well-Being, Development and Health for Danish Children through a Healthy New Nordic Diet (OPUS) School Meal Study was a school lunch program where children were served a mid-morning snack, a hot lunch meal, and an afternoon snack. School lunch was served buffet style and children were encouraged to taste everything and keep a reasonable plate distribution. Meals were free of charge and the children cooked, tasted, and served the food.</p> <p>Comparison: usual care was lunch packed from home, which typically consisted of cold open-faced rye bread sandwiches with meat topping and some fresh fruits</p> <p>Study Period: August 2011 – June 2012</p>	<p>Total Energy Intake (kJ/d) Intervention baseline: 7755 kJ/d Summary Effect: 19, 95%CI -110, 149</p> <p>Fruit and vegetable intake (g/d) Intervention baseline: 260 g/d Relative Percent Change: 4% Adjusted Change: 12 g/d</p> <p>Total cholesterol (mmol/l) Intervention baseline: 4.09 mmol/l Summary Effect: -0.50 mmol/l, 95%CI -0.08, -0.02</p> <p>HDL (mmol/l) Intervention baseline: 1.44 mmol/l Summary Effect: -0.02 mmol/l, 95%CI -0.03, 0.0</p> <p>LDL (mmol/l) Intervention baseline: 2.33 mmol/l Summary Effect: -0.02 mmol/l, 95%CI -0.05, 0</p> <p>Systolic BP (mmHg) Intervention baseline: 107.5 mmHg Summary Effect: -0.3 mmHg, 95%CI -0.8, 0.2</p> <p>Diastolic BP (mmHg) Intervention baseline: 68.0 mmHg Summary Effect: -0.5 mmHg, 95%CI -1.0, 0</p>

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			<p>BMIz Intervention baseline: 0.14 Summary Effect: 0.01, 95%CI 0.0, 0.03</p> <p>Paper conclusions: Author states that there were small improvements in blood pressure, an increase of 0.5 cm (95% CI 0.3, 0.7) in waist circumference, but BMIz remained unaffected. Vegetable consumption increased and fruit consumption did not increase.</p>
<p>Author, Year: Davis, 2009</p> <p>Study Design: Post-test only with comparison</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: High school students (9th through 12th grade)</p> <p>Sample size: 2,892</p> <p>Demographics: Mean age: NR but in 9th to 12th grades Gender: 55.1% Race/ethnicity: 35.2% African American, 10.0% Asian/other, 31.1% Hispanic, 23.7% White SES: 57% of students enrolled in intervention schools and 38% of students enrolled in control schools listed as economically disadvantaged</p>	<p>Location (urbanicity): Houston, TX (urban, suburban)</p> <p>Intervention activities: Fresh fruit and vegetable snacks were provided to students for three semesters. School foodservice staff prepared baskets of fresh fruits and vegetables daily for each homeroom teacher. Teachers collected baskets and students were allowed to eat items in classroom. Teachers were encouraged to talk about fruits and vegetables in their classrooms.</p> <p>Comparison: no fruit and vegetable baskets offered</p> <p>Study Period: Spring 2006 – Spring 2007</p>	<p>Fruit (percent reporting ≥1 time/day in preceding 7 days) Intervention: 59.1 Control: 40.9 Estimated effect: -9.2 pct pts</p> <p>Fruit & fruit juice (percent reporting ≥2 times/day in preceding 7 days) Intervention: 39.3 Control: 27.3 Estimated effect: -12 pct pts</p> <p>Vegetables (percent reporting ≥3 times/day in preceding 7 days) Intervention: 12.5 Control: 13.4 Estimated effect: +0.9 pct pts</p> <p>Fruit, fruit juice, & vegetables (percent reporting ≥5 times/day in preceding 7 days) Intervention: 22.0 Control: 18.4 Estimated effect: -3.6 pct pts</p>
<p>Author, Year: Gates, 2013</p>	<p>Study population: First Nation children Pre-K to 8th grade</p> <p>Sample size: 24</p>	<p>Location (urbanicity): Remote northern Ontario First Nation communities in Kashechewan, Canada (rural)</p>	<p>Milk and alternatives (cheese, yogurt, and alternatives to milk products that provide similar nutritional value in terms of calcium and vitamin D) (servings/d)</p>

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<p>Study Design: before-after</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Good</p>	<p>Demographics: Mean age: 13 years (range: 11-14 years) Gender: 39.5% female Race/ethnicity: 100% Kashechewan First Nation SES: low-income Overweight/obese: 42.5% overweight, 17.5% obese</p>	<p>Intervention activities: fruit and vegetable program</p> <p>Pilot snack program where each day at least one serving from the vegetables and fruit, and the milk and alternatives food groups of Canada’s Food Guide was served.</p> <p>Comparison: NA</p> <p>Study Period: May 2009 to end of 2009-10 school year</p>	<p>Baseline: 2.4 serv/d Follow-up: 1.7 serv/d Summary Effect: -0.7 serv/d (p=0.32)</p> <p>Overweight/Obesity Prevalence Combined Baseline: 60.0% Follow-up: 49.1% Summary Effect: -10.9 pct pts</p> <p>Obesity Prevalence Baseline: 17.5% Follow-up: 26.3% Summary Effect: 8.80 pct pts</p> <p>Paper conclusions: This study demonstrates the potential of school food provision programs to positively impact the extremely low intakes of milk and alternatives and associated nutrients in First Nation youth. Unfortunately, the ideal circumstances of the pilot program often do not exist, and programs suffer when resources are lacking.</p>															
<p>Author, Year: Jamelske, 2012</p> <p>Study Design: group non-randomized control trial</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Study population: 4th-5th grade students</p> <p>Sample size: 258</p> <p>Demographics: FFVP (4 d/wk and 3 d/wk) Mean age: 9.7 yrs 4 d/wk; 9.5 yrs 3 d/wk Gender: 49% female 4 d/wk; 58.9% 3 d/w/ Race/ethnicity:</p> <table border="1" data-bbox="403 1266 882 1424"> <thead> <tr> <th></th> <th>4 d/wk</th> <th>3 d/wk</th> </tr> </thead> <tbody> <tr> <td>white</td> <td>70.6%</td> <td>75.3%</td> </tr> <tr> <td>Asian Am</td> <td>17.6%</td> <td>16.4%</td> </tr> <tr> <td>African Am</td> <td>3.9%</td> <td>2.7%</td> </tr> <tr> <td>Latino</td> <td>2.0%</td> <td>1.4%</td> </tr> </tbody> </table>		4 d/wk	3 d/wk	white	70.6%	75.3%	Asian Am	17.6%	16.4%	African Am	3.9%	2.7%	Latino	2.0%	1.4%	<p>Location (urbanicity): Wisconsin (NR)</p> <p>Intervention activities: Investigation of the USDA's Fresh Fruit and Vegetable Program (FFVP) in select Wisconsin schools. One arm received free F&V 4 days/week; another arm had free F&V 3 days/week</p> <p>Comparison: allowed to bring a snack from home</p> <p>Study Period: Oct 2008-April 2009</p>	<p>F&V consumption 4 d/wk arm: Fruit intake (morning snack) baseline: 0.05 serv/snack follow-up: 0.48 serv/snack Vegetable intake (morning snack) baseline: 0 serv/snack follow-up: 0.33 serv/snack</p> <p>3d/wk arm: Fruit intake (morning snack) baseline: 0.04 serv/snack follow-up: 0.27 serv/snack Vegetable intake (morning snack) baseline: 0.01 serv/snack follow-up: 0.29 serv/snack</p>
	4 d/wk	3 d/wk																
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Study	Population Characteristics	Intervention Characteristics	Results
	<p>Amer Ind 5.9% 4.1% SES: percent of students qualifying for free/reduced price school meals: overall rates were 75% for 4 d/wk and, 53% for 3 d/wk</p> <p><u>Control group (usual care)</u> Mean age: 9.7 yrs Gender: 50.7% female Race/ethnicity: white 84.3%; Asian Amer 9.0% African Am 1.5%; Latino 3.0%; Amer Ind 2.0% SES: percent of students qualifying for free/reduced price school meals 42%</p>		<p>Paper conclusions: Program students experienced a significant increase in fruit and vegetable intake for morning snack compared to control students. Positive effects of the FFVP were present early on, with no gains resulting from additional months of participation. The program effect is somewhat limited as students did not bring fruit and vegetables from home to eat on days when free snacks were not provided.</p>
<p>Author, Year: Kastorini, 2016</p> <p>Study Design: before-after</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: Targeted all students, children aged 3-12 years and adolescents aged 12-18 years</p> <p>Sample size: 3,941</p> <p>Demographics: Age: 3-18 years; 74.3% children (3-13 years), 25.7% adolescents (12-18 years) Gender: 51% female Race/ethnicity: NR SES: Family Affluence Scale: 34.9% low, 52.6% medium, 12.5% high Country of birth: 95.7% children born in Greece, 69.8% father's born in Greece, 66.8% mother's born in Greece Overweight/obese: 23.9% overweight, 7.1% obese, 59.2% normal weight, 9.8% underweight</p>	<p>Location (urbanicity): Greece: 68.3% Attica, 16.5% Thessaloniki, 15.2% rest of Greece, (NR)</p> <p>Intervention activities: school lunch policy + nutrition education + taste tests + food prep</p> <p>The DIATROFI program provided students with free daily meals and promoted healthy nutrition for students and their families. Meals were high in fruit, vegetables, and protein, with exclusive use of olive oil and no preservatives, trans fats, or sweetened drinks. Educational materials encouraging health eating and physical activity were distributed to families throughout the school year.</p> <p>Comparison: NA</p> <p>Study Period: 2012-2013</p>	<p>KIDMED score (range -4 to 11) Baseline: 5.08 Follow-up: 5.13 Summary Effect: 0.05</p> <p>Milk/yogurt (serv/d) Baseline: 1.23 serv/d Follow-up: 1.44 serv/d Summary Effect: 0.21 serv/d</p> <p>Fruit and vegetable intake (serv/d) Baseline: 1.56 serv/d Follow-up: 1.83 serv/d Relative Percent Change: 17.3%</p> <p>Overweight/Obesity prevalence: Baseline: 31.0% Follow-up: 28.9%</p> <p>Paper conclusions: At program completion, there were significant increases in milk or yogurt and fruits and vegetables. KIDMED scores increased significantly among adolescent girls.</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
<p>Author, Year: Lin, 2016</p> <p>Study Design: Repeat cross sectional</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: 4th-6th grade students</p> <p>Sample size: 5,274</p> <p>Demographics: <u>City/sub (n= 4,299)</u> Mean age: 4th 40.2%; 5th 42.9%; 6th 16.9% rural: 22.6% Gender: 51.2% female Race/ethnicity: Asian or Asian American 2.4%; African American 25.8%; White 35.4%; Native American 3.5%; Other 32.9% Non Hispanic 68.8%; Hispanic 31.2% SES: FFVP awarded to schools with high percentage free or reduced price lunch</p> <p><u>Town/rural (n= 1,045)</u> Mean age: 4th 37.1%; 5th 40.3%; 6th 22.6% Gender: 49.4% female Race/ethnicity: Asian or Asian American 1.0%; African American 7.1%; White 72.4%; Native American 3.2%; Other 16.3% Non Hispanic 89.2%; Hispanic 10.8% SES: FFVP awarded to schools with high percentage free or reduced price lunch</p>	<p>Location (urbanicity): Indiana (urban, suburban, rural)</p> <p>Intervention activities: Data were derived from the Indiana FFVP Student Survey conducted by the IDOE to monitor the program during the 2011-2012 school year. Surveys from fourth- to sixth-grade students were collected in selected schools, twice during the school year; at the beginning and 8 months later.</p> <p>Comparison: NA</p> <p>Study Period: fall 2011-spring 2012</p>	<p>Fruit intake frequency (times/d) <u>Urban/suburban</u> Change in frequency: 0.79, p<0.01</p> <p><u>Town/rural</u> Change in frequency: 1.02, p<0.01</p> <p>Vegetable intake frequency <u>Urban/suburban</u> Change in frequency: 0.01, p=0.95</p> <p><u>Town/rural</u> Change in frequency: 0.52, p=0.03</p> <p>Paper conclusions: FFVP improved fruit and vegetable eating behaviors in the “town and rural” group, but was only partially effective in the “city and suburb” group. Strategies to implement FFVP may need to differ depending on school locale.</p>
<p>Author, Year: Moore, 2008</p> <p>Study Design: repeat cross-sectional</p> <p>Suitability of Design: Least</p>	<p>Study population: Primary and junior school students in 5th and 6th grade</p> <p>Sample size: 1,632</p> <p>Demographics: <u>Intervention</u> Age: 9-11 years</p>	<p>Location (urbanicity): England & Wales (NR)</p> <p>Intervention activities: fruit and vegetable program</p> <p>Fruit tuck shops that offered a choice of fruit priced at 15 pence. Schools were instructed to refrain from offering</p>	<p>Fruit consumption at school Intervention: baseline: 0.62 serv/d follow-up: 0.74 serv/d Control: baseline: 0.68 serv/d follow-up: 0.69 serv/d Summary Effect: 0.06 serv/d, 95%CI -0.10, 0.21</p>

Study	Population Characteristics	Intervention Characteristics	Results
<p>Quality of Execution: Fair</p>	<p>Gender: 50.3% female Race/ethnicity: NR SES: all included schools had a free school meal entitlement greater than the national average of 17%</p> <p><u>Intervention</u> Age: 9-11 years Gender: 52.5% female Race/ethnicity: NR SES: all included schools had a free school meal entitlement greater than the national average of 17%</p>	<p>sweets, crisps, and other items at the tuck shop.</p> <p>Comparison: asked to continue with existing curriculum and school meal arrangements</p> <p>Study Period: 1999</p>	<p>Fruit consumption during whole day Intervention: baseline: 2.48 serv/d follow-up: 2.54 serv/d Control: baseline: 2.50 serv/d follow-up: 2.51 serv/d Summary Effect: 0.08 serv/d, 95%CI -0.20, 0.38</p> <p>Sweets consumption at school Intervention: baseline: 1.14 serv/d follow-up: 1.12 serv/d Control: baseline: 1.09 serv/d follow-up: 1.01 serv/d Summary Effect: -0.12 serv/d, 95%CI -0.29, 0.06</p> <p>Sweets consumption during whole day Intervention: baseline: 3.98 serv/d follow-up: 3.95 serv/d Control: baseline: 3.68 serv/d follow-up: 3.81 serv/d Summary Effect: -0.14 serv/d, 95%CI -0.53, 0.26</p> <p>Crisps consumption at school Intervention: baseline: 0.73 serv/d follow-up: 0.80 serv/d Control: baseline: 0.67 serv/d follow-up: 0.68 serv/d Summary Effect: -0.05 serv/d, 95%CI -0.15, 0.06</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
			<p>Crisps consumption during whole day Intervention: baseline: 1.53 serv/d follow-up: 1.60 serv/d Control: baseline: 1.41 serv/d follow-up: 1.45 serv/d Summary Effect: -0.04 serv/d, 95%CI -0.25, 0.18</p> <p>Paper conclusions: Authors concluded that in isolation, fruit tuck shops were not effective in changing children’s snacking behavior in schools. However, the results suggest that fruit tuck shops have a greater impact when coupled with school policies that restrict the types of foods students are allowed to bring to school.</p>
<p>Author, Year: Olsho, 2015</p> <p>Study Design: Cross sectional with comparison</p> <p>Suitability of Design; Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: 4th-6th grade students</p> <p>Sample size: 4,696</p> <p>Demographics: <u>Intervention</u> Mean age: 4th-6th grade Gender: 56.1% female Race/ethnicity: black 25.7%; white 21.0%; Hispanic 45.2%; other 8.0% SES: eligible for free lunch 74.7% eligible for reduced lunch 7.9% not eligible for free or reduced lunch 17.4%</p> <p><u>Control</u> Mean age: 4th-6th grade Gender: 57.0% female Race/ethnicity: black 22.7%; white 29.8% Hispanic 38.6%; other 8.9%</p>	<p>Location (urbanicity): 16 states</p> <p>Intervention activities: fruit and vegetable program</p> <p>The FFVP require that the fresh F&V be served outside of school meals, school are encouraged to distribute a wide variety of fresh F&V 2 times/wk.</p> <p>Comparison: usual care</p> <p>Study Period: Sept 2010 - June 2011 (post-testing Feb - June)</p>	<p>Total energy intake (kcal/d) Intervention: 1,925 Control: 1,878 Estimated effect: 47, p<0.001</p> <p>Total Fruit and Vegetable Intake (cup equivalent/d) Intervention: 2.39 Control: 2.07 Estimated effect: 0.32, p=0.187</p> <p>Paper conclusions: The FFVP increases child fresh and total F&V intake in school, and fresh F&V intake outside of school.</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
	<p>SES: eligible for free lunch 69.7% eligible for reduced lunch 8.9% not eligible for free or reduced lunch 21.4%</p>		
<p>Author, Year: Perry, 2004</p> <p>Study Design: Group RCT</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Study population: 1st and 3rd grade students</p> <p>Sample size: 1,668</p> <p>Demographics: Age: NR Gender: 49% female Race/ethnicity: NR SES: NR</p>	<p>Location (urbanicity): Twin Cities metropolitan area of Minnesota (urban)</p> <p>Intervention activities: school lunch policy + fruit and vegetable program + placement of healthier food + nutrition education + taste tests</p> <p>Cafeteria Power Plus Intervention included activities aimed at increasing availability and appeal of fruits and vegetables in the lunch line. Food service staff were encouraged to increase choices, make fruits and vegetables more attractive to students, and vary offerings (type and preparation methods). Staff were also asked to verbally encourage students to eat more fruits and vegetables. Special events included education campaigns and monthly samplings.</p> <p>Comparison: not described</p> <p>Study Period: 1999-00 to 2001-02 school years</p>	<p>Mean number of fruit and vegetable servings per lunch Intervention: 1.3 serv/lunch Control: 1.2 serv/lunch Adjusted Summary Effect: 0.9 serv/lunch, p=0.33</p> <p>Mean number of fruit (no juice) servings per lunch Intervention: 0.37 serv/lunch Control: 0.21 serv/lunch Adjusted Summary Effect: 0.17 serv/lunch, p<0.01</p> <p>Mean number of vegetable servicing per lunch Intervention: 0.52 serv/lunch Control: 0.58 serv/lunch Adjusted Summary Effect: -0.06 serv/lunch, p=0.32</p> <p>Mean number of fruit juice servings per lunch Intervention: 0.42 serv/lunch Control: 0.42 serv/lunch Adjusted Summary Effect: -0.01 serv/lunch, p=0.77</p> <p>Paper conclusions: A multicomponent intervention aimed at environmental changes in the elementary school cafeteria may impact children’s total fruit and vegetable consumption (through increases in fruit consumption).</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
<p>Author, Year: Qian, 2014</p> <p>Study Design: Time series</p> <p>Suitability of Design: Moderate</p> <p>Quality of Execution: Fair</p>	<p>Study population: All students however results are from 2nd, 4th, 6th, 8th, and 10th grade students</p> <p>Sample size: NR</p> <p>Demographics: Age: NR Gender: NR Race/ethnicity: NR SES: at least 50% of students eligible for free or reduced lunches</p>	<p>Location (urbanicity): Arkansas (mixed)</p> <p>Intervention activities: fruit and vegetable program</p> <p>USDA’s Fresh Fruit and Vegetable Program (FFVP) is intended to increase fruit and vegetable consumption by reimbursing schools for offering fresh fruits and vegetables during the school day but separate from the lunch and breakfast meals.</p> <p>Comparison: NA</p> <p>Study Period: 2007-08 baseline – 2010 (24 months)</p>	<p>BMIz Summary Effect: -0.139</p> <p>Paper conclusions: Author concludes that FFVP seems like a promising way of improving the diet and reducing childhood obesity among elementary school children.</p>
<p>Author, Year: Radcliffe, 2005</p> <p>Study Design: Group RCT</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Study population: 7th grade students</p> <p>Sample size: 754</p> <p>Demographics: <u>Intervention</u> Age: participants aged 11-12 years Gender: 53.4% female Race/ethnicity: NR SES: 39.1% high SES, 31.5% medium SES, 29.5% low SES Urbanicity: 61.0% urban, 13.0% rural, 25.9% remote</p> <p><u>Control</u> Age: participants aged 11-12 years Gender: 45.2% female Race/ethnicity: NR SES: 50.7% high SES, 8.5% medium SES, 40.8% low SES</p>	<p>Location (urbanicity): Queensland, Australia (urban, rural)</p> <p>Intervention activities: school breakfast policy + placement of healthier food + nutrition education + taste tests</p> <p>Intervention schools formed working groups that were representative of the whole school community and consisted of senior staff, teachers, parents, students, etc.). Project staff assisted working groups in developing, implementing and evaluating action plans to address specific breakfast issues. Action plans included strategies in three main areas: curriculum, school ethos and environment, and partnerships with the community.</p> <p>Comparison: not described</p>	<p>Intake of any fruit (not including juice) at breakfast (% of students selecting item) Intervention: baseline: 15.4, follow-up: 14.8 Control: baseline: 10.9, follow-up: 11.9 Adjusted Summary Effect -0.41 pct pts, p=0.68</p> <p>Intake(% of students selecting item) Intervention: baseline: 42.8, follow-up: 44.3 Control: baseline: 52.2, follow-up: 45.0 Adjusted Summary Effect: 8.7 pct pts, NS</p> <p>Reported intake of any EDMP food or drink (% of students selecting item) Intervention: baseline: 22.6, follow-up: 20.4 Control: baseline: 17.6, follow-up: 26.0 Adjusted Summary Effect: -2.3 pct pts, p=0.02</p> <p>Percent of students reporting any fruit juice with breakfast (% of students selecting item)</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
	<p>Urbanicity: 54.5% urban, 45.5% rural, 0% remote</p>	<p>Study Period: 2002</p>	<p>Intervention: baseline: 33.0, follow-up: 30.2 Control: baseline: 32.8, follow-up: 29.1 Adjusted Summary Effect: 0.31pct pts, p=0.76</p> <p>Paper conclusions: Authors conclude that multi-strategy approaches to address the quality of breakfast consumed by upper primary school children that include curriculum, partnerships with families, and food supply with and outside the school are recommended.</p>
<p>Author, Year: Taber, 2013a state laws governing)</p> <p>Study Design: cross sectional with comparison</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: 9-12th grade students</p> <p>Sample size: 9,574</p> <p>Demographics: Mean age: Not reported Gender: 49.8% female Race/ethnicity: 58.0% White; 14.5% African-American; 18.8% Hispanic; 8.7% Other SES: 15.6% state-level poverty rate; 28.5% obese adults (state-level)</p>	<p>Location (urbanicity): US (AL, AZ, CA, CO, DE, FL, GA, IL, KS, MD, MI, MN, MS, MO, NJ, NM, NY, NC, OH, OR, PA, SC, TN, TX, VA, WA)</p> <p>Intervention activities: state law requiring minimum number of fruits and vegetables in school meals for high schools</p> <p>Comparison: no state law</p> <p>Study Period: post-test spring 2010</p>	<p>FV intake (cups/day) Students in California and Mississippi consumed .03 fewer cups of fruit (95% CI: -0.09, 0.03) and .04 more cups of vegetables (95% CI: -0.02, 0.11) per day compared to students in states that did not require FV in school meals</p> <p>Among school lunch consumers: No difference in fruit intake; but association with vegetable intake was statistically significant ($\beta = 0.09$, 95% CI: 0.00, 0.18)</p> <p>Disparities in mean FV intake Among school lunch consumers: disparities in mean intake between students with regular access to unhealthy snacks only and vs student with regular access to FV only were smaller in CA and MS compared to students in states that did not require FV in school meals for fruit intake ($\beta = 0.54$, 95% CI: 0.03, 1.06) and vegetable intake ($\beta = 0.56$, 95% CI: 0.18, 0.94); disparities also reduced among students without regular access to FV or unhealthy snacks ($\beta = 0.38$, 95% CI: 0.15, 0.61).</p>
<p>Author, Year: Taber, 2013b (Association between state laws governing</p>	<p>Study population: Middle school students part of ECLS-K cohort, but results are for mostly 8th grade students</p>	<p>Location (urbanicity): 40 states in US (NR)</p>	<p>Obesity Prevalence Summary Effect: -7.7 pct pts (weighted average decrease of full price lunch students and free/reduced price lunch students)</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
<p>school meal nutrition content and student weight status)</p> <p>Study Design: Cross-sectional with comparison group</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Sample size: 4,870</p> <p>Demographics: Age: NR Gender: 50.6% female Race/ethnicity: 63.4% White, 10.3% African American, 17.0% Hispanic, 9.2% other SES: SES quintiles: 17.1% lowest SES quintile, 22.1% 2nd quintile, 21.3% 3rd quintile, 19.4% 4th quintile, 20.1% highest SES quintile Urbanicity: 42.6% suburban</p>	<p>Intervention activities: school lunch policy</p> <p>Policy evaluation that compared states that exceeded national lunch standards to those that adhered to standards.</p> <p>Comparison: schools located in states with state laws that did not exceed USDA standards</p> <p>Study Period: Spring 2007</p>	<p>Paper conclusions: Author concludes that the evidence supporting stringent school meal standards is far from conclusive, but this study provides promising signs of the potential for the USDA updated standards to improve student weight status.</p>
<p>Author, Year: Tak, 2007</p> <p>Study Design: Group non-randomized</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Good</p>	<p>Study population: 4th grade students</p> <p>Sample size: 953</p> <p>Demographics: Mean age: 9.9 years Gender: 51.8% female Race/ethnicity: 68.7% Dutch, 31.3% non-Western SES: parental education level: 23.6% low, 33.5% moderate, 32.9% high</p>	<p>Location (urbanicity): The Netherlands (urban)</p> <p>Intervention activities: fruit and vegetable program + nutrition education</p> <p>Schoolgruitem Project increased availability and accessibility of F&V at school by providing a piece of fruit or ready-to eat vegetables (cherry tomatoes, baby carrots) for free twice a week at the mid-morning break. There was also a school curriculum to increase knowledge and skills related to fruit and vegetable consumption. The curriculum was optional.</p> <p>Comparison: usual care</p> <p>Study Period: unclear</p>	<p>Fruit and Vegetable Intake</p> <p><u>Dutch ethnicity</u> Fruit (pieces/day) Intervention: baseline: 1.54 pieces/d follow-up: 1.55 pieces/d Control: baseline: 1.60 pieces/d follow-up: 1.37 pieces/d Vegetable (g/day) Intervention: baseline: 99.1 g/d follow-up: 102.5 g/d Control: baseline: 97.2 g/d follow-up: 93.8 g/d</p> <p><u>Non-Western ethnicity</u> Fruit Intervention: baseline: 1.97 pieces/d follow-up: 1.80 pieces/d Control: baseline: 2.13 pieces/d follow-up: 1.77 pieces/d Vegetable</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
			<p>Intervention: baseline: 120.6 g/d follow-up: 120.2 g/d Control: baseline: 120.4 g/d follow-up: 104.2 g/d Relative Change in Fruit and Vegetable Intake: 20%</p> <p>Paper conclusions: Author concludes that the present study provides some evidence that the Schoolgruiten intervention was effective in increasing the fruit intake of children of Dutch ethnicity and increasing the vegetable intake of children of non-Western ethnicity.</p>
<p>Author, Year: te Velde, 2008</p> <p>Study Design: Group RCT</p> <p>Suitability of Design: Greatest</p> <p>Quality of Execution: Fair</p>	<p>Study population: Targeted all school students but results are for 5th and 6th grade students</p> <p>Sample size: 1,472</p> <p>Demographics: <u>Intervention</u> Mean age: 10.8 years Gender: 54.3% female Race/ethnicity: NR SES: family educational level: 8.3% <7 years, 25.2% 7-9 years, 26.0% 10-12 years, 40.5% >12 years</p> <p><u>Control</u> Mean age: 10.7 years Gender: 50.6% female Race/ethnicity: NR SES: family educational level: 8.1% <7 years, 17.8% 7-9 years, 31.4% 10-12 years, 42.6% >12 years</p>	<p>Location (urbanicity): Buskerud, Norway; Rotterdam, the Netherlands, Bilbao region, Spain (NR)</p> <p>Intervention activities: school lunch policy + fruit and vegetable program + placement of healthier foods + nutrition education</p> <p>The Pro-Children intervention consist of a classroom component, a school component, a family component, and an optional component that differed by intervention site. The classroom curriculum addressed nutritional knowledge, awareness of intake, taste and preferences for fruits and vegetables, and food preparation skills. The school component included the provision of fruit and vegetables during the school day and a specific fruit break. Parental involvement was encouraged through homework assignments, newsletters, and a parent version of the</p>	<p>Fruit and Vegetable Intake (g/day) Intervention: baseline: 256 g/d follow-up: 277 g/d Control: baseline: 264 g/d follow-up: 224 g/d Relative Percent Change: 23%</p> <p>Paper conclusions: Author concludes that the present student indicates that the Pro Children intervention significantly improved fruit and vegetable intakes in schoolchildren at the end of the school year in which the intervention was fully implemented. However, one year later during which a less intensive intervention was conducted, a significant impact was only observed among the Norwegian children.</p>

Summary Evidence Table – School Obesity, Meal and Fruit and Vegetable Snack Interventions

Study	Population Characteristics	Intervention Characteristics	Results
		<p>web-based tool. The optional component consisted of community involvement.</p> <p>Comparison: in Spain, comparison school received F&V in lunches; in Norway, comparison group was offered to participate in subscription program</p> <p>Study Period: September 2003 – May 2005</p>	
<p>Author, Year: Triador, 2015 (linked study: Hanbazaza, 2015)</p> <p>Study Design: before-after</p> <p>Suitability of Design: Least</p> <p>Quality of Execution: Fair</p>	<p>Study population: students in grade 1-6</p> <p>Sample size: 76</p> <p>Demographics: Age: 9.0 yrs Gender: 47% female Race/ethnicity: 100% Kipohtakaw SES: low SES, median family income 31,000 Canadian which is lower than the median</p>	<p>Location: providence of Alberta, Alexander, First Nations reserve</p> <p>Intervention activities: 25 Earthboxes were assembled and then planted by children with the seeds of tomatoes, green beans, beets, lettuce, carrots, green peppers, zucchini, chives, and dill. School Snack program (4 months): The school chef purchased, prepared, and distributed 7 vegetables (carrots, celery, cucumbers, cauliflower, peas, tomatoes, and peppers) and 7 fruits (grapes, bananas, oranges, cantaloupe, strawberries, watermelon, and apricots) to children. One raw food was offered weekly to all children.</p> <p>Comparison: NA</p> <p>Study Period: Nov 2010-June 2011</p>	<p>Fruit and vegetable intake: Children reported increased consumption at home in 10 of 17 vegetables and fruit; these changes were not significant</p> <p>Paper conclusions: School interventions have the potential to increase children’s preferences for vegetables and fruit.</p>