Social Determinants of Health: Healthy School Meals for All

Summary Evidence Table

This table outlines information from the studies included in the Community Guide systematic review of Healthy School Meals for All. It details study quality, population and intervention characteristics, and study outcomes considered in this review. Complete references for each study can be found in the Included Studies section of the review summary.

Abbreviations Used in This Document:

- Study design:
    - RCT: randomized controlled trial

- Measurement and analysis terms:
    - CI: confidence interval
    - NR: not reported
    - NS: not significant
    - Pct pts: percentage points
    - SD: standard deviation

- Other terms
    - CDC: Centers for Disease Control and Prevention
    - CEP: Community Eligibility Provision
    - FPL: federal poverty level
    - FRPM: free and reduced-price meals
    - HSMA: Healthy School Meals for All
    - K: kindergarten
    - ISP: identified student percentage
    - LEA: lead education agency
    - NOS: Newcastle-Ottawa Scale
    - NSLP: National School Lunch Program
    - SBP: School Breakfast Program
    - SNAP: Supplemental Nutrition Assistance Program
    - SY: school year
    - TANF: Temporary Assistance for Needy Families
    - US: United States
    - USDA: United States Department of Agriculture

Outcomes Reported in This Review:

- Meal participation (breakfast and lunch)
- School attendance (days present in schools, days absent in school)
- Academic performance (math, reading, and science test scores)
- Dietary intake and meal patterns (breakfast skipping, breakfast dietary intake, full-day dietary intake)
- Food security (household food security status)

Notes:

- **Intervention**: The intervention offers free, nutritious meals (i.e., breakfast, lunch, or both) to all students in a qualifying school, regardless of household income.
- **Comparison:** All included studies compared HSMA to the traditional model of the USDA's NSLP and SBP which uses household income-based requirements to determine eligibility for FRPM.
- **Suitability of design**: Includes three categories: greatest, moderate, or least suitable design. Read more
- **Risk of bias assessment**: Performed using the NOS adapted by Cohen et al. 2021. Studies were assessed to have low risk of bias, high risk of bias, or very high risk of bias. Studies with high or very high risk of bias were excluded from the review.
- **Sample population:** Reported as number of schools evaluated, number of students in study schools, and/or number of student-year observations.
- **Rounding:** Final effect estimates greater than zero are rounded to the nearest tenth; estimates less than zero are rounded to the nearest hundredth.

Study	Intervention Characteristics	Population Characteristics	Results
Author, Year Andreyeva et al. 2021 **Location** US: 41 states **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low risk of bias (NOS=9 points) **Outcomes reported** Meal participation School attendance Academic performance Food security **Evaluation duration** 12-72 months	**Setting** School level: Elementary School grades: K to 5 School type: Public and private **Dates for HSMA implementation** 2010-2016 SYs **Geographic scale** Mix of urban, suburban, and rural; 34.4% suburban and 13.4% rural **Provision for HSMA** CEP **Free meals offered during evaluation period** Breakfast and lunch	**Eligibility criteria for inclusion in evaluation** Intervention: Schools that were part of the Early Childhood Longitudinal Study and enrolled in kindergarten during the 2010-2011 SY Comparison**:** Schools that were not participating in CEP for the school year being analyzed **Total sample population** Schools evaluated: 700 Students in study schools: 2,500 Student-year observations: 12,750 **Demographics** Age: NR Sex: 48.8% females; 51.2% males Race/Ethnicity: 24.5% White 23.4% Black; 38.2% Hispanic Households with lower incomes: 61.5% household income below 200% of FPL	**Meal participation** Outcome measure: Percentage of students participating in school lunch program Results: Relative change: +9.3%; p<.01 **School attendance** Outcome measure: Percentage of students attending school on an average day Results: Absolute difference: +0.24 pct pts; p<.01 **Academic performance** Outcome measure: Math, reading, and science test scores Results: No change in math, reading, or science test scores **Food security** Outcome measure: Percentage of students living in households that experienced food security, low food security, and very low food security Results: Relative change: • Food security: -1.3% (CI: -3.5, 0.9) • Low food security: +1.1% (CI: -0.8, 3.1) • Very low food security: +0.1% (CI: -1.3, 1.4)
Author, Year Bartfeld et al. 2019 **Location** US: Wisconsin **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low risk of bias (NOS=9 points)	**Setting** School level: Elementary School grades: 1-5 for school attendance; 3-5 for academic performance School type: Public **Dates for HSMA implementation** 2009-2014 SYs **Geographic scale** Mix of urban, suburban, and rural **Provision for HSMA** Not specified	**Eligibility criteria for inclusion in evaluation** Public schools in Wisconsin except for schools in the Milwaukee Public School District. Comparison: Schools that implemented the SBP but not HSMA from 2008-2009 SY through 2013-2014 SY. **Total sample population** *School attendance* Schools evaluated: 1,007 Students in study schools: 481,799 Student-year observations: 1,217,396 *Academic performance* Schools evaluated: 883	**School attendance** *Days present* Outcome measure: Average percentage of days students were present Results: Absolute difference: +.24 pct pts or +43% of a day; p<.05 *Days absent* Outcome measure: Percentage of students with low attendance (i.e., absent more than 5% of the school year or more than 10 days) Results: Absolute difference: -3.5 pct pts; p<.01 **Academic performance** Outcome measure: Math and reading test scores

Study	Intervention Characteristics	Population Characteristics	Results
Outcomes reported School attendance Academic performance **Evaluation duration** 12-60 months	**Free meals offered during evaluation period** Breakfast	Students in study schools: 248,328 Student-year observations: 463,558 **Demographics** Age: NR Sex: 48.6% females; 41.2% males Race/Ethnicity: 78.5% White; 5.3% Black; 3.3% Asian; 1.7% Native American; 9.5% Hispanic Households with lower incomes: 31.7% received SNAP in last 3 years	Results: Absolute difference • Math: +.03 SD; NS • Reading: +.01 SD; NS
Author, Year Bartfeld et al. 2020 **Location** US: Wisconsin **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low risk of bias (NOS=9 points) **Outcomes reported** School attendance **Evaluation duration** 12-24 months	**Setting** School level: Elementary School grades: 1-5 School type: Public **Dates for HSMA implementation** 2014-2016 SYs **Geographic scale** Mix of urban, suburban, and rural **Provision for HSMA** CEP **Free meals offered during evaluation period** Breakfast and lunch	**Eligibility criteria for inclusion in evaluation:** Intervention: Schools that implemented CEP in 2014-2015 SY or 2015-2016 SY or both, with an ISP of at least 40%. Comparison: Schools that were eligible to implement CEP as of 2014-15 SY but did not. Schools that introduced CEP in the second implementation year were excluded as of that year and contributed only a single year of follow up data. **Total sample population** Schools evaluated: 145 Students in study schools: NR Student-year observations: 91,126 Demographics: Age: NR Sex: NR Race/Ethnicity: 47.3% Nonwhite persons Households with lower incomes: 68.9% household income below 185% FPL or participation in SNAP	**School attendance** *Days present* Outcome measure: Average percentage of days students were present Results: Absolute difference: +0.32 pct pts or +58% of a day; NS *Days absent* Outcome measure: Proportion of students with low attendance (i.e., absent more than 5% of the school year or more than 10 days) Results: Absolute difference: -3.5 pct pts; p<0.05
Author, Year Bernstein et al. 2004 **Location** US: Boise, ID Columbiana, AL Gulfport, MS	**Setting** School level: Elementary School grades: 2-6 School type: Public **Dates for HSMA implementation** 2000-2003 SYs	**Eligibility criteria for inclusion in evaluation** Intervention: Districts that were broadly representative of all districts participating in the SBP. Comparison: Schools in the same district randomly assigned to offer the traditional SBP which provides	**Meal participation** Outcome measure: Percentage of students participating in school breakfast Results: Intervention Control Pre 18.9% 19.1% Post 36.3% 21.1% Absolute difference: +15.4 pct pts; p<0.01

Study	Intervention Characteristics	Population Characteristics	Results

Phoenix, AZ
Santa Rosa, CA
Wichita, KS
 	
Study Design
Group RCT
 	
Suitability of Design
Greatest
 	
Risk of bias
Low risk of bias (NOS = 9 points)
 	
Outcomes reported
Meal participation
School attendance
Academic performance
Dietary intake and meal patterns
 	
Evaluation duration
12-36 months
	Geographic scale
	Urban: 4 locations
	Boise, ID; Santa Rosa, CA;
	Phoenix, AR; Wichita, KS
	Mixed urban, suburban, rural: 2 locations
	Gulfport, MS; Columbiana; AL
	
	Provision for HSMA
	Not specified
	
	Free meals offered during evaluation period
	Breakfast
		free or reduced-price breakfasts to eligible students from households with lower incomes.
		
		Total sample population
		Schools evaluated: 153
		Students in study schools: 79,458
		Student-year observations: NR
		
		Demographics
		Mean age: 9.8 years
		Sex: 48.0% male; 52% female
		Race/Ethnicity: 64% White; 11% African American; 17% Hispanic
		Households with lower incomes:
		18% <$20,000/year; 49% eligible for FRPM
			Relative change: +74.3%
			
			School attendance
			Outcome measure: Average percentage of days students were present
			Results:
			           Intervention Control
			Pre 93.9% 94.1%
			Post 93.2% 92.9%
			Absolute difference: +0.50 pct pts; NS
			Relative change: +90% of a day; NS
			
			Academic performance
			Outcome measure: Math and reading achievement reported as normal curve equivalent scores at school level
			Results:
			Math:
			           Intervention Control
			Pre 53.6 53.3
			Post 52.4 51.6
			Absolute difference: +0.50 pct pts; NS
			
			Reading:
			           Intervention Control
			Pre 55.1 55.1
			Post 49.9 49.6
			Absolute difference: +0.30 pct pts; NS
			Relative change: NR
			
			Dietary intake and meal patterns
			Outcome measure: Proportion of students who skipped breakfast
			Results: No change
			
			Outcome measure: Proportion of students who consumed a nutritionally substantive breakfast
			Results:
			Intervention: 80%
			Comparison: 76%
			Absolute difference: +4.0 pct pts; p<.01

Study	Intervention Characteristics	Population Characteristics	Results
			Outcome measure: Student full-day dietary intake measured using a 24-hour dietary recall Results: Overall no change in students' full-day dietary intake
Author, Year Gordanier et al. 2020 **Location** US: South Carolina **Study Design** Pre-post with comparison group **Suitability of Design** Greatest **Risk of bias** Low risk of bias (NOS = 9 points) **Outcomes reported** Meal participation School attendance Academic performance **Evaluation duration** 12-24 months	**Setting** School level: Elementary and middle School grades: 3-8 School type: Public **Dates for HSMA implementation** 2014-2016 SYs **Geographic scale** Mix of urban, suburban and rural; 55.8% urban **Provision for HSMA** CEP **Free meals offered during evaluation period** Lunch	**Eligibility criteria for inclusion in evaluation** Intervention: Schools that implemented CEP in 2014-2015 SY and/or 2015-2016 SY and had an ISP of at least 40% or belonged to a district in which the ISP was at least 40%. Comparison: Schools that did not implement CEP during the 2014-2015 SY or 2015-2016 SY. **Total sample population** Schools: 780 Students in study schools: 332,761 Student-year observations: 670,392 **Demographics** Mean age: NR Sex: 48.8% female; 51.2% male Race/Ethnicity: 53.5% White; 35.4% African American; 8.4% Hispanic; 2.1% Asian; 0.6% American Indian/Alaska Native Households with lower incomes: 62.3% received TANF, SNAP, or free or reduced-price lunches	**Meal participation** Outcome measure: Average daily percentage of students participating in the school lunch program Results: Absolute difference: +4.9 pct pts; $p<0.01$ Relative change: +7.7% **School attendance** Outcome measure: Average number of days student was absent Results: Absolute difference: Elementary school: -23.1% of a day; $p<0.05$ Middle school: -42.1% of a day; NS **Academic performance** Outcome measure: Math and reading tests Results: Absolute difference Math/elementary school: +0.06 SD; $p<0.01$ Math/middle school: +0.01 SD; NS Reading/elementary school: +0.02 SD; NS Reading/middle school: +0.01 SD; NS
Author, Year Leos-Urbel et al. 2013 **Location** US: New York City, NY **Study design** Single group pre-post **Suitability of design** Least **Risk of bias**	**Setting** School level: Elementary and middle School grades: 3-8 School type: Public **Dates for HSMA implementation** 2003-2004 SY **Geographic scale** Urban **Provision for HSMA**	**Eligibility criteria for inclusion in evaluation:** Intervention: New York City made school breakfast free for all elementary and middle school students regardless of income, replacing traditional breakfast programs funded through SBP Comparison: Same schools before the policy change **Total sample population** Schools evaluated: 668 Students in study schools: 552,400 Student-year observations: NR	**Meal participation** Outcome measure: Daily uptake as measured by number of meals/ (number of students x school days) Results: Students who previously paid full price for breakfast Absolute difference: Pre: 11 meals per student per year Post: +6 meals per student per year Relative change: +55% Students who previously paid reduced price for breakfast Absolute difference: Pre: 16 meals per student per year

Study	Intervention Characteristics	Population Characteristics	Results
Low risk of bias (NOS = 8 points) **Outcomes reported** Meal participation **Evaluation duration** 12 months	NYC policy change **Free meals offered during evaluation period** Breakfast	**Demographics** Mean age: NR Sex: NR Race/Ethnicity 17.8% White; 32.3% African American; 35.7% Hispanic; 14.0% Asian Household with lower incomes: 71.3% eligible for free meals; 9.4% eligible for reduced-price meals	Post: +5.5 meals per student per year Relative change: +33% Students who were previously eligible for free breakfast Absolute change: Pre: 37 meals per student per year Post: +6 meals per student per year Relative change: +15%

Author, Year
Logan et al. 2014
 	
Location
US:
Illinois
Kentucky
Michigan
Ohio
New York
West Virginia
 	
Study design
Pre-post with comparison group
 	
Suitability of design
Greatest
 	
Risk of bias
Low risk of bias (NOS = 7 points)
 	
Outcomes reported
Meal participation
 	
Evaluation duration
12-24 months
	Setting
	School level: Elementary, middle, high
	School grades: K-12
	School type: Public
	
	Dates for HSMA implementation
	2011-2012 SY
	2012-2013 SY
	
	Geographic scale
	Mix of urban, suburban and rural; 32.1% urban
	
	Provision for HSMA
	CEP
	
	Free meals offered during evaluation period
	Breakfast and lunch
		Eligibility criteria for inclusion in evaluation
		Intervention: At least one school in the LEA was participating in CEP in 2011-2012 SY or 2012-2013 SY
		
		Comparison: LEAs that did not adopt CEP but were similar to LEAs who did.
		
		Total sample population
		Schools: 7,257
		Students in study schools: NR
		Student-year observations: NR
		
		Demographics
		Mean age: NR; 50.6% elementary; 23.2% middle; 23.4% high school students
		Sex: NR
		Race/Ethnicity: 31.9% African American; 7.4% Hispanic
		Households with lower incomes: 73.2% eligible for FRPM
			Meal participation
			Outcome measure: Average daily participation
			Results:
			Breakfast
			
			           Intervention Control
			Pre 46.2% 38.3%
			Post 52.3% 40.7%
			Absolute difference: +3.6 pct pts; p<0.01
			Relative change: +9.4%
			
			Lunch
			           Intervention Control
			Pre 72.4% 68.5%
			Post 76.3% 68.9%
			Absolute difference: +3.5 pct pts; p<0.01
			Relative difference: +5.2%

Author, Year Pokorney et al. 2019 **Location**	**Setting** School level: Elementary, middle, high School grades: K-12	**Eligibility criteria for inclusion in evaluation** Intervention: Public schools in Pennsylvania who implemented CEP in 2014-15 SY and made meal	**Meal participation** Outcome measure: Mean number of meals served per student per year Results:

Study	Intervention Characteristics	Population Characteristics	Results
US: Pennsylvania **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low (NOS = 8 points) **Outcomes reported** Meal participation **Evaluation duration** 12 months	School type: Public **Dates for HSMA Implementation** 2014-2015 SY **Geographic scale** Urban **Provision for HSMA** CEP **Free meals offered during evaluation period** Lunch	count data publicly available in SY2013-14 and SY2014-15 Comparison: Public schools in Pennsylvania who did not implement CEP in 2014-2015 SY and made meal count data publicly available in SY2013-14 and SY2014-15 **Total sample population** Schools evaluated: 1,762 Students in study schools: NR Student-year observations: NR **Demographics** Mean age*:* NR Sex: NR Race/Ethnicity: NR Households with lower incomes: 63.3% eligible FRPM	Absolute difference: +3.6 pct pts Relative change: 8.0%
Author, Year Ribar et al. 2013 **Location** US: Guilford County, NC **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low risk of bias (NOS = 8 points) **Outcomes reported** Meal participation School attendance Academic performance **Evaluation duration**	**Setting** School level: Elementary School grades: 1-5 School type: Public **Dates for HSMA Implementation** 2008-2009 SY **Geographic Scale** Urban **Provision for HSMA** NR **Free meals offered during evaluation period** Breakfast	**Eligibility criteria for inclusion in evaluation** Intervention: Schools that changed breakfast program from SBP to free breakfast for all students Comparison: Schools without changes to the SBP, matched to intervention schools. **Total sample population** Schools evaluated: 6 Students in study schools: 987 Student-year observations: NR **Demographics** Mean age*:* NR Sex: 48.2% female; 51.8% male Race/Ethnicity 55.7% African American; 20.2% Hispanic Households with lower incomes: 76.5% eligible free meals; 8.5% eligible reduced-price meals	**Meal participation** Outcome measure: Average number of breakfasts served per year per student Results: Absolute difference: +16.4 pct pts; p<0.05. **School Attendance** Outcome measure: Average percentage of days students were present Results: Absolute difference: -0.3 pct pts; p>0.05. **Academic performance** Outcome measure: Proportion of students proficient on math, reading, and science tests Results: Absolute difference: • Math proficiency: +1.4 pct pts; NS • Math standardized score: +0.045 SD; NS • Reading proficiency: +0.6 pct pts; NS • Reading standardized score: +0.029 SD; NS • Science proficiency: +6.8 pct pts; p<0.05 • Science standardized score: +0.740 SD; NS

Study	Intervention Characteristics	Population Characteristics	Results
12 months			
Author, Year Ruffini 2021 **Location** US: Georgia Illinois Kentucky New York Maryland West Virginia **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low risk of bias (NOS = 9 points) **Outcomes reported** Meal participation Academic performance **Evaluation duration** 24-48 months	**Setting** School level: Elementary and middle School grades: 3-8 School type: Public **Dates for HSMA Implementation** 2012-2017 SY **Geographic scale** Mix of urban, suburban and rural; 15.5% urban **Provision for HSMA** CEP **Free meals offered during evaluation period** Breakfast and lunch	**Eligibility criteria for inclusion in evaluation** Intervention: Districts that had at least one school implementing CEP between 2012-2017 SY Comparison: Districts that did not have at least one school implementing CEP between 2012-2017 SY **Total sample population:** Schools evaluated: NR Students in study schools: NR Student-Year observations: 18,800-20,000 **Demographics:** Mean age: NR Sex: NR Race/Ethnicity: 22.5% African American; 16.7% Hispanic Households with lower incomes: 58.6% eligible FRPM	**Meal participation** Outcome measure: Number of breakfasts or lunches served per student per year Results: Breakfast: Absolute difference: +19.9 breakfasts; p<0.01 Relative change: 37.8% Lunch: Absolute difference: +13.2 lunches; p<0.01 Relative change: 11.8%; p<.01 **Academic achievement** Outcome measure: Math and reading test scores Results Absolute difference Math: +0.00 SD; NS Reading: +0.01 SD; NS
Author, Year Schneider et al. 2021 **Location** US: Texas **Study design** Pre-post with comparison group **Suitability of design**	**Setting** School level: Elementary, middle, and high School grades: K-12 School type: Public **Dates for HSMA implementation** 2014-2015 SY 2018-2019 SY **Geographic scale** Mix of urban, suburban and rural	**Eligibility criteria for inclusion in evaluation** Intervention: CEP is available to an individual school, group of schools, or entire district, with an ISP of at least 40% Comparison: Schools without CEP who opted into CEP during the study period **Total sample population** Schools evaluated: 2,797 Students in study schools: NR Student-Year observations: 16,103	**Meal participation** Outcome measure: Monthly uptake; number of meals served divided by total enrollment Results: Breakfast: Intervention Control Pre 53.7% 47.6% Post 57.5% 46.0% Absolute difference: +4.6 pct pts; p<0.001 Relative change: +11.0%

Study	Intervention Characteristics	Population Characteristics	Results
Greatest **Risk of bias** Low risk of bias (NOS = 9 points) **Outcomes reported** Meal participation **Evaluation duration** 12-60 months	**Provision for HSMA** CEP **Free meals offered during evaluation period** Breakfast and lunch	**Demographics** Mean age: NR Sex: NR Race/Ethnicity: 15.4% White; 13.2% African American; 64.4% Hispanic; 1.4% Asian; 0.10% Native Hawaiian/Pacific Islander; 1.2% multi-racial Households with lower incomes: 79.6% eligible FRPM	Lunch: Intervention Control Pre 74.2% 47.6% Post 72.2% 68.6% Absolute difference: +4.3 pct pts; $p<0.001$ Relative change: +7.0%
Author, Year Schwartz et al. 2020 **Location** US: New York City, NY **Study design** Pre-post with comparison group **Suitability of design** Greatest **Risk of bias** Low risk of bias (NOS = 8 points) **Outcomes reported** Meal participation School attendance Academic performance **Evaluation duration** 12-36 months	**Setting** School level: Middle School grades: 6-8 School type: Public **Dates for HSMA implementation** 2010-2011 SY 2012-2013 SY **Geographic Scale** Urban **Provision for HSMA** Provision 2 **Free meals offered during evaluation period** Lunch (added to free breakfast, which was already being offered)	**Eligibility criteria for inclusion in evaluation** Intervention: HSMA expanded in NYC in 2010-2011 SY, and extended to all freestanding middle schools in September 2014; analysis done with schools that ever-implemented HSMA under Provision 2 during 2010-2013 SY Comparison: Schools in NYC not having HSMA at any time during the study period **Total sample population** Schools: NR Students in study schools: 155,496 Student-Year observations: 318,637 **Demographics** Mean age: NR Sex: 50.5% female; 49.5% male Race/Ethnicity: 12.1% White; 25.8% African American; 42.6% Hispanic; 19.5% Asian Households with lower incomes: 92.4% eligible FRPM	**Meal Participation** Outcome measure: Number of lunch transactions divided by the number of school days in the year Results: Absolute difference: Poor students: +5.4 pct pts; $p<0.01$ Non-poor students: +11.0 pct pts; $p<0.05$ **School attendance** Outcome measure: Attendance rate Results: Absolute difference: -0.04SD; NS **Academic performance** Outcome measure: Math and reading test scores Results: Absolute difference: Math: +0.04 SD; $p<0.01$ Reading: +0.03 SD; $p<0.01$
Author, Year Tan et al. 2020 **Location** US: Nationwide	**Setting** School level: Elementary, middle School grades: K – 8; 35.1% early elementary (K-2); 30.6% late	**Eligibility criteria for inclusion in evaluation** Intervention: Schools that adopted CEP during or prior to the year of data collection.	**Meal participation** Outcome measure: Percentage of students who ate school meal one or more days a week. Results: Breakfast:

Study	Intervention Characteristics	Population Characteristics	Results
Study design Retrospective cohort **Suitability of design** Moderate **Risk of bias** Low risk of bias (NOS = 7 points) **Outcomes reported** Meal participation **Evaluation duration** 12-36 months	elementary (3-5); 34.3% middle (6-8) **School type** Public **Dates for HSMA implementation** 2011-2015 SY **Geographic Scale** Mix of urban, suburban and rural; 43.7% urban, 32.1% suburban, 24.2% rural **Provision for HSMA** CEP **Free meals offered during evaluation period**: Breakfast and lunch	Comparison: Similar schools without the option of CEP. **Total sample population** Schools evaluated: 198 Students in study schools: 2,305 Student-Year observations: NR **Demographics** Mean age: 9.5 Sex: 52.4% female; 47.6% male Race/Ethnicity: 18.2% White; 25.2% African American; 52.5% Hispanic; 4.2% Other Household with lower incomes: 57.1% receive WIC or SNAP	Absolute difference FRPM eligible: +4.9 pct pts Nearly FRPM eligible: +10.3 pct pts Full price: +34.7 pct pts Lunch: Absolute difference FRPM eligible: +1.2 pct pts Nearly FRPM eligible: +11.2 pct pts Full price: +23.4 pct pts

Author, Year
Turner et al. 2019
 	
Location
US: California
 	
Study design
Pre-post with comparison group
 	
Suitability of design
Greatest
 	
Risk of bias
Low risk (NOS = 9 points)
 	
Outcomes reported
Meal participation
 	
Evaluation duration
12-24 months
	Setting:
	School level: Elementary, middle, and high school
	School grades: K–12
	School type: Public
	
	Dates for HSMA implementation
	2013-2014 SY
	2016-2017 SY
	
	Geographic scale
	Mix of urban, suburban and rural; 19.8% rural; 79.2% urban or suburban
	
	Provision for HSMA:
	Provisions 1,2,3, or CEP
	
	Free meals offered during evaluation period
	Breakfast and lunch
		Eligibility criteria for inclusion in evaluation
		Intervention: Eligibility for each specific provision was in accordance with the provision's guidelines; Provision 1 available to schools with at least 80% students eligible for FRPM; CEP and Provisions 2 and 3 available to all schools
		
		Comparison: Schools without CEP who eventually opted into CEP during the study period
		
		Total sample population
		Schools: 9,930
		Students in study schools: 963,410
		Student-Year observations: NR
		
		Demographics
		Mean age: NR
		Sex: NR
		Race/Ethnicity: 28.9% of schools with ≥75% students identified as Hispanic; 69.5% of schools with <75% students identified as Hispanic
			Meal participation
			Outcome measure: Monthly uptake; total meals served each month divided by total number of students and number of operating days
			Results:
			
			Breakfast:
			        Intervention Control
			Pre 41.1% 38.8%
			Post 44.6% 38.7%
			Absolute difference: +3.5 pct pts; p<0.001
			Relative change: +8.5%
			
			Lunch:
			        Intervention Control
			Pre 68.6% 67.9%
			Post 73.9% 67.4%
			Absolute difference: +5.8 pct pts; p<0.001
			Relative change: +8.5%

Study	Intervention Characteristics	Population Characteristics	Results
		Households with lower incomes: 41.3% of schools with >75% students eligible for FRPM	