

Promising and Low-Cost Strategies to Improve School Meal Consumption

Research Brief, October 2021

Introduction

The United States Department of Agriculture (USDA) National School Lunch Program (NSLP) and School Breakfast Program (SBP) provide school-age children with healthy, low-cost meals throughout the school year. The NSLP was established in 1946 as a “measure of national security, to safeguard the health and well-being of the Nation’s children...”¹ Today, the federal school meal programs continue to play an important role in ensuring students have access to healthy meals, with roughly 95% of schools (both public and private) participating.² Prior to COVID-19, approximately 30 million children received school meals daily, and many rely on school foods for up to half of their daily energy intake.^{3,4} Schools can therefore play an essential role in improving the diets and overall health of children.

The Healthy, Hunger-Free Kids Act of 2010 (HHFKA) strengthened school meal nutrition standards. Research has found either increases or no association with school meal consumption after implementation of the HHFKA.⁸⁻¹¹ This strongly suggests that the healthier school meal standards have not adversely impacted school meal intake. However, the overall problem of uneaten food in schools has been documented for decades, particularly for fruits and vegetables. Thanks to HHFKA, school meals are on average healthier than those brought from home, and their consumption may result in greater satiety, thus less unhealthy food consumption outside of school.^{12,13} As a consequence, it’s important to understand the most effective strategies to increase school meal consumption — which would reduce wasted food, improve student diets, and reduce diet-related health disparities.

The aim of this research brief is to highlight and summarize the evidence of promising, low-maintenance, and low-cost strategies that can be implemented by school districts to increase the consumption of healthy school meals. All of these strategies have been associated with meaningful improvements in meal consumption and require minimal funding and technical support, making them realistic for schools to implement. The information in this brief is drawn from [“Strategies to Improve School Meal Consumption: A Systematic Review,”](#) published in *Nutrients*. The review examined publications from the start of the literature to May 2021 on modifiable factors associated with school meal consumption. The approaches examined in this body of research include changes at the school meal level (choices, food preparation, and taste tests); cafeteria environment level (choice architecture, nutrition education, school lunch duration, and recess before lunch); and policy level (local, state, and federal policies). The findings from this brief can be used to inform the development of policies and practices that support healthy eating environments in schools.



Making School Meals Healthier

The Healthy, Hunger-Free Kids Act of 2010 (HHFKA) strengthened school meal nutrition standards, and included requirements for a variety of vegetables offered weekly; larger portion sizes for fruits and vegetables; more whole grains; and limits on sodium and total calories.⁵ The Smart Snacks standards, also implemented as part of HHFKA, regulated the snacks and beverages sold separately from school meals (i.e., competitive foods sold through vending machines, school stores, and a la carte).⁶ Districts were also required to update their local wellness policies to encourage healthier school environments.⁷

The Evidence

Promising Initiatives and Policies to Increase School Meal Consumption

These initiatives and policies were found by the majority of relevant studies to result in significantly increased meal consumption. These strategies can also be implemented without external funding or additional assistance.

- **More Food Choices for Students.** Schools are required to offer five meal components: fruit, vegetable, meat/meat alternative, grain, and milk. Offering at least two choices within one of these meal component categories (e.g., two types of fruit) was found by the majority of studies (8 of 12) to increase intake. Providing choices increases the likelihood that at least one option will be appealing to students with differing preferences. These choices can be available on the lunch line or through salad bars (with research suggesting that students consume more when salad bars are located on the serving line compared with after the serving line¹⁴). Schools can provide more options by using cost-effective food procurement strategies, such as purchasing USDA commodity foods; participating in the USDA Department of Defense Fresh Fruit and Vegetable Program; buying locally grown and produced foods; and incorporating produce grown in school gardens.
- **Pre-Slicing Fruit.** Whole fruits such as apples and oranges can be difficult for children to consume in the cafeteria, especially when they have a limited amount of time to eat. Younger children may also struggle to peel, hold, and bite larger fruits, whereas older children may have concerns regarding braces, or the perceived mess. These issues can be addressed by pre-slicing fruit, and nearly all studies that focused on this strategy (7 of 9) found a positive association with consumption. Some research also suggests that while elementary school students eat more when only pre-sliced fruit is available, older students may prefer the option to select between pre-sliced and whole fruit.¹⁵
- **Longer Lunch Periods.** There are currently no national standards for the length of school lunch periods and as a result, they vary within and between districts. Many schools have lunch periods that are 20 minutes or less, and this often includes the time spent walking to the cafeteria and waiting on the lunch line for food.^{16,17} Although only four studies examined lunch period length, three of them found a positive relationship between the amount of time provided to eat and student consumption. Lunch periods that were 30 minutes appeared to have greater benefits for students compared with 25 minutes or less. While schools may be reluctant to lengthen lunch periods without correspondingly longer school days, prior research suggests that these small reductions in academic time may be offset by improved attentiveness in the classroom (and therefore more efficient learning).¹⁸ Additionally, students may benefit from the social and emotional learning opportunities from interactions with peers during the unstructured time at lunch.
- **Recess Before Lunch.** Recess typically occurs after lunch in U.S. elementary schools. However, some schools have reversed this order in an effort to prevent students from rushing through their meal and to increase the likelihood that students will be hungry during lunch. The majority of studies on this topic (7 of 10) found a positive association between scheduling recess before lunch and school meal consumption. Additionally, recess before lunch may help reduce disruptive student behavior in the cafeteria.¹⁸
- **Limiting Access to Snack Foods.** Some schools sell “competitive foods,” which are snack foods and beverages that are not part of the reimbursable school meal. When students are able to purchase these items, they may eat less of their school meal, or forgo the school meal entirely. Policies that limit students’ access to these competitive foods during the school day have the potential to increase school meal consumption. Nearly all studies in the review (5 of 6) found that students consumed more of their school meals when competitive foods were limited or unavailable. Concerns about revenue losses for the school if there are restrictions on competitive foods may also be unfounded; prior research has found that strong competitive food policies are, in fact, associated with increased school meal participation, which can result in these changes being cost-neutral.¹⁹
- **Enhancing Palatability and Cultural Appropriateness of Meals.** A primary determinant of food consumption is taste. Enhancing the palatability of school meals, especially with familiar and culturally appropriate flavors and seasonings, has strong potential to increase their acceptance and consumption. The majority of studies focused on palatability (6 of 9) found a positive association between initiatives that improved recipes and flavors (e.g., collaborations with chefs and/or with added seasonings) and consumption. To make this strategy cost-neutral, schools can partner with volunteer chefs from local restaurants. While potentially more expensive, many districts have hired chefs when there are openings for a new cafeteria employee to help offset costs. Additionally, many free resources to enhance the palatability of school meals (including low-cost recipes and culinary workshops) currently exist through the USDA, state departments of education, and nonprofit organizations.

Recipe Resources

Let's Cook Healthy School Meals by Project Bread

[John Stalker Institute of Food and Nutrition](#)

Additional Strategies Examined in the Literature

The review identified some strategies and policies that either had limited evidence of increasing consumption or required higher levels of staff involvement or costs. These strategies may provide other benefits to students or may be feasible for schools with more resources.

- **Nutrition Education.** Nutrition education can be an integral part of school efforts to ensure students have the knowledge and skills required to make healthy decisions. In this review, roughly half of the studies (6 out of 11) found a positive association between nutrition education and school meal consumption, while the remainder did not. These mixed findings may be due to variations in the intensity and duration of nutrition education programs. Importantly, prior research has found other benefits of nutrition education, including improvements in students' overall diets and lower BMI.²⁰ This highlights the need for more funding and resources for schools to implement strong, theory-based nutrition education programs that are complemented by teacher training, as well as rigorous evaluations of these programs.
- **Choice Architecture (aka “Smarter Lunchroom Movement”).** Many U.S. schools have implemented Smarter Lunchroom strategies to “nudge” students toward the healthier options available in the cafeteria. These strategies include using attractive bowls, offering vegetables first on the lunch line, providing promotional signage, and using creative or exciting names for healthy dishes such as “x-ray carrots.” In this review, only 4 out of 16 studies examining commonly used nudge techniques found a significant effect on consumption. However, these strategies may increase the selection of certain meal components, such as fruits and vegetables, which in turn may provide students with small repeated exposures to meal components and increase overall consumption at the population level.²¹ These strategies may also be more effective if combined with some of the other evidence-based meal consumption strategies described above. While nearly all studies (8 of 9) that provided students with rewards (e.g., classroom parties, stickers, toys) for eating fruits and vegetables found increases in consumption, this strategy may be expensive and burdensome to maintain.

What We Still Need To Know

There are a few strategies that require more rigorous research in order to draw conclusions about their impact on meal consumption.

- **Taste Tests.** Taste tests may provide students with the opportunity for repeated exposures, which can improve acceptability of new foods and enable students to provide feedback to help select preferred menu items. Previous research examining taste tests in school cafeterias have found mixed results, but nearly all (9 of 10) had weak study designs that may have introduced bias. This lack of consistent evidence highlights the need for more rigorous evaluations.
- **Local School Wellness Policies.** Many of the effective strategies identified above can be written into school wellness policies. More research is needed on how to promote the inclusion of these evidence-based practices in written policies. Research is also needed on factors associated with full implementation of wellness policies, including the roles of stakeholder involvement, leadership buy-in, and a regular schedule for monitoring, evaluation, and reporting.
- **Availability of Chocolate Milk.** Chocolate milk has both added sugars and more calories compared with unflavored milk, but it is unclear if overall milk consumption is adversely impacted if access to chocolate milk is restricted. While short-term studies examining limited access to chocolate milk have found decreases in overall milk consumption, the findings from longer-term studies where students have had time to adjust to the new options are mixed. Of note, Smarter Lunchroom strategies that nudge students toward unflavored milk (when flavored milk remains available) do not appear to be effective. Therefore, more research is needed to understand the longer-term impact of limited access to chocolate milk.

Conclusions

School meals play an important role in the diets of children. While the HHFKA was an important step forward in improving the quality of school meals, more efforts are needed to ensure students are eating these healthier foods. There is strong evidence to support a variety of low-cost strategies to improve school meal consumption, including providing more choices for students on the lunch line; scheduling longer lunch periods and recess before lunch; pre-slicing fruits; enhancing the palatability of foods; and limiting access to competitive foods in schools. More rigorous implementation and evaluation of taste tests and limiting chocolate milk are necessary to understand the impact of these strategies on school meal consumption. This review also highlights the need for more funding and resources for nutrition education so that high-quality programming can be provided to students with concurrent rigorous evaluations. Lastly, schools that currently rely on Smarter Lunchroom techniques should strongly consider adopting additional evidence-based strategies to improve school meal consumption.

Policy Implications

The findings from this review indicate that there are several actions that can be taken by schools, policymakers, and advocates that have strong potential to improve school meal consumption. Importantly, these approaches can be implemented with minimal associated costs. Based on the current evidence, we recommend the following strategies:

- **Implement District Policies For Recess Before Lunch.** School districts should strongly consider policies that require recess to occur prior to lunch. This has the potential to both increase school meal consumption and create calmer lunchroom environments. The latter can help to address the concern that student behavior may become problematic during longer lunch periods.
- **Limit Access To Competitive Foods During School Hours.** Policies at the district, state, and federal levels that further limit access to competitive foods (including those sold by schools or available through classroom parties and fundraisers) can have important implications for school meal participation and consumption rates. A phased approach, such as beginning with elementary schools, may help with implementation of this policy.
- **Enact State/Federal Policies For Minimum School Lunch Lengths.** Policies at the state or federal level should guarantee students a minimum amount of time to eat lunch at school. The current evidence suggests that students benefit the most from at least 25 minutes of seated time, which is typically achieved with 30-minute lunch periods.

- **Maintain Or Strengthen The Healthy, Hunger-Free Kids Act.** The HHFKA improved the quality of school meals, resulting in school meals being of higher nutritional quality than meals brought from home, without impacting waste.^{12,22,23} Therefore, policymakers should focus on ways to further strengthen the HHFKA, such as limits on added sugars, in addition to policies that include the evidence-based strategies that improve consumption of the healthy meals available in schools.

Suggested Citation

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About Healthy Eating Research

Healthy Eating Research (HER) is a national program of the Robert Wood Johnson Foundation. Technical assistance and direction are provided by Duke University under the direction of Mary Story PhD, RD, program director, and Megan Lott, MPH, RDN, deputy director. HER supports research to identify, analyze, and evaluate environmental and policy strategies that can promote healthy eating among children and prevent childhood obesity. Special emphasis is given to research projects that benefit children and adolescents and their families, especially among lower-income and racial and ethnic minority population groups that are at highest risk for poor health and well-being and nutrition related health disparities. For more information, visit www.healthyeatingresearch.org or follow HER on Twitter at [@HERResearch](https://twitter.com/HERResearch).

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