

Use of Salad Bars in Schools to Increase Fruit and Vegetable Consumption: Where's the Evidence?



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THE FEDERAL GOVERNMENT SPENT \$11.5 BILLION IN 2013 to serve nutritious meals to more than 30.7 million students as part of the US Department of Agriculture (USDA) National School Lunch Program (NSLP).¹ Nutrition standards set by the USDA were revised in 2012 as mandated by the Healthy, Hunger-Free Kids Act of 2010.² Based on the Dietary Guidelines for Americans, the new standards require schools to offer greater quantities of fruits and vegetables (F/V), as well as offer a greater variety.

The shift to offer more F/V through NSLP is critical because school-aged children do not come close to meeting the recommended nine to 13 servings of F/V each day.³ Further, children's F/V intake declines as they get older, decreasing by at least one serving through adolescence.⁴ Fruit and vegetable intake is linked to the prevention of chronic diseases such as diabetes,⁵ heart disease,⁶ obesity,^{7,8} and some cancers.^{9,10} Millions of students participate in school meal programs and evidence suggests that habits formed during childhood can carry into adulthood,¹¹ making schools an important venue for promoting F/V intake.

NATIONWIDE PROMOTION OF SALAD BARS

There is significant support and encouragement at the national level for increasing the use of school salad bars to improve F/V consumption among school-aged children.¹²⁻¹⁵ One of the most prominent efforts, Let's Move Salad Bars to Schools (LMSB2S), is a public-private partnership in support of First Lady Michelle Obama's Let's Move initiative. Launched in 2010, this partnership emphasizes salad bars as a key strategy to increase students' consumption of F/V. As of July 2014, LMSB2S has granted 3,481 salad bars across more than 1,000 school districts, reaching approximately 58% of their goal of funding and disseminating 6,000 salad bars;

LMSB2S reports a waiting list of almost 500 schools.¹⁶ Further, the United Fresh Produce Association Foundation has created an A Salad Bar in Every School¹⁷ campaign and the Centers for Disease Control and Prevention cites the use of salad bars as a major strategy for states and communities in addressing childhood obesity.¹⁸ Not surprisingly, this push has generated a lot of interest in salad bars among school foodservice authorities across the nation.

The nationwide promotion of salad bars in schools as a means to increase consumption of F/V has been relatively rapid. In 2002, 21% of schools participating in the NSLP offered salad bars at least one time per week.^{19,20} As of 2013, 41% of middle school students and 47% of high school students throughout the United States attended public schools with salad bars offered as part of the NSLP meal, and the percentage of students with salad bars available via à la carte was 23% and 34% for middle schools and high schools, respectively.²¹ Although there are no current national prevalence estimates for elementary schools, recent surveys conducted among kindergarten through grade 12 schools in Arizona indicate 70% to 75% of responding schools had salad bars²² and Missouri reported around 15.7% statewide prevalence for elementary schools.²³ Surveys also indicated that middle schools and high schools are more likely to report having salad bars compared with elementary schools.^{20,24}

The support for school salad bars gained further momentum after release of the 2012 USDA school meal guidelines, which required a greater focus on F/V in school lunches. Promoting school salad bars, the USDA Food and Nutrition Service, in a 2013 memo to all state and regional directors of Child Nutrition Programs, offered the following guidance¹⁴:

"Schools with salad bars offer a wider variety of vegetables and fruits than other schools. Salad bars have the potential to improve nutrition and encourage the consumption of fruits, vegetables, and legumes. In addition to nutritional benefits, salad bars may lower plate waste in school feeding programs."

"We encourage school food authorities to incorporate salad bars into their school food service operation when possible..."

These national recommendations encourage salad bar use because of the potential to improve F/V consumption and reduce plate waste; in this commentary, we highlight the quantity and quality of the existing evidence on the issue and

find that very little research has examined the topic. Although there are indications that salad bars may improve students' F/V consumption, more research is needed to evaluate the effectiveness of salad bars, explain how salad bars may increase F/V consumption and reduce waste, examine contextual factors associated with successful implementation, and assess cost-effective and feasible school-based strategies to improve F/V consumption among children.

STATE OF THE EVIDENCE

Peer-Reviewed Literature

Little peer-reviewed literature has examined the independent effects of salad bars on F/V consumption, waste, or participation rates in school settings. Adams and colleagues²⁵ compared students in elementary schools with established salad bars with students in schools that provided preportioned (now considered precupped) F/V without a bar. Elementary school students were sampled from four schools roughly matched on the population of nonwhite students, free or reduced-price lunch eligibility, and daily entrée items. F/V consumption and waste were measured for each child by weighing of F/V before and after lunch. The authors found no significant differences in the average combined amounts of F/V taken or consumed between students attending schools with or without a salad bar. However, the authors observed that students' F/V consumption differed by variety (ie, number) of F/V items offered in schools regardless of the presence of a salad bar, and the greatest proportion of waste occurred among students exposed to a low-variety salad bar, supporting recommendations to increase variety.

Slusser and colleagues²⁶ reported on an intervention that introduced an F/V salad bar at lunch as a menu option in the Los Angeles Unified School District during the 1999–2000 school year. In this single-group experiment, three elementary schools were selected from a larger study. To all three schools a new salad bar was introduced that included at least four culturally acceptable F/V choices along with protein, dairy, and grain items daily. The program also educated students on proper salad bar etiquette, provided information about selecting a balanced lunch, and introduced marketing components such as children's artwork in the cafeteria and field trips to farmers' markets and farms. The study evaluated differences in F/V consumption with serial cross-sectional surveys conducted in 1998 and 2000 using 24-hour recalls. Results indicated daily frequency of F/V consumption differed significantly by 1.12 items per day between 1998 and 2000. Despite this change being over an entire day, further analysis by meal suggested that 84% of this increase could be linked to school-time meals.

Gosliner²⁷ published an observational study of school-level predictors of F/V consumption among ethnically diverse middle school and high school students. The researchers visited 31 northern California schools and more than 5,400 students reported their past day's intake of fruit and/or vegetables. Gosliner²⁷ found that 38% of schools had an existing salad bar and students' reported vegetable consumption was 48% greater in schools with a salad bar after adjusting for school-level factors and student characteristics. The authors did not examine the number of salad bars or the

influence of salad bars on fruit consumption due to collinearity concerns in their analyses.²⁷

Terry-McElrath and colleagues²⁸ used pooled data from nationally representative, cross-sectional surveys collected annually between 2008 and 2012 on almost 30,000 students in more than 800 middle schools and high schools to examine associations between salad bar availability (presence), accessibility (via school meal or à la carte, both, or neither), and daily fruit or vegetable consumption independently. This study found at least one salad bar available to 39% of middle school students and to 49% of high school students. The authors observed that among middle school students, consumption of green vegetables was greater by about 7% in the presence of a salad bar (via school lunch or à la carte) in schools, after rigorous adjustments for student and school characteristics (including the presence of competitive foods). These effects were not observed for fruit consumption or among high school students and the influence of multiple salad bars of any one type (ie, à la carte or serving line) or differences by location was not reported. A second report from this survey found that school wellness policies were not associated with the prevalence of salad bars.²⁹

In addition to the peer-reviewed literature described above, a number of program evaluations of salad bars are available online.^{15,22–24,30–33} Results from this so-called gray literature have not been peer-reviewed but have been cited in reports and peer-reviewed studies as evidence of the effects of salad bars on consumption and waste. With few exceptions, consistently lacking from almost every program evaluation is how salad bars influence the F/V consumed.

CONCLUSIONS

Many gaps appear to exist in the peer-reviewed literature on the effectiveness of school salad bars. Two of the four peer-reviewed studies (and most of the program evaluations) have focused on elementary school-aged students.^{25,26} We have little understanding of the influence of salad bars on food choices, consumption, waste, and attitudes of middle school and high school students, where salad bars are more prevalent. As outlined in our commentary, the existing peer-reviewed literature includes three observational studies^{25,27,28} and one experimental²⁶ study that provide limited evidence. The plate waste study did not find a difference in F/V consumption between salad bars and preportioned servings; instead, item variety was more predictive of what elementary school students self-selected, ate, and wasted.²⁵ Both surveys found small relationships between salad bars and reported consumption of vegetables (but not fruit),^{27,28} with the nationally representative survey finding a relationship between salad bars and vegetable consumption among students in middle schools only.²⁸ The one experimental study suggested salad bars may contribute to improved F/V consumption in elementary schools,²⁶ but this study had limitations and is open to alternative explanations because it evaluated a multicomponent intervention that included education and salad bars with limited controls, so attributing the difference in F/V consumption to the salad bar alone was not possible.

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