

The New Federal School Nutrition Standards and Meal Patterns: Early Evidence Examining the Influence on Student Dietary Behavior and the School Food Environment

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THE FEDERALLY FUNDED NATIONAL SCHOOL BREAKFAST Program and National School Lunch Program enable participating school districts to provide breakfast and lunch meals to children, either for free or at a reduced price depending on eligibility, or at full price.¹ Children receive free or reduced-price meals in cases where they reside in homes with household income ≤ 1.30 or ≤ 1.85 of the federal income poverty guidelines, respectively.² The meals must meet nutrition standards and meal patterns, which have evolved as nutrition knowledge has advanced over the years.¹ The latest revisions to the nutrition standards and meal patterns, implemented during fall 2012, were initiated by a requirement in the 2004 Child Nutrition Reauthorization Act to update the school meal nutrition standards to align with the 2005 US Dietary Guidelines for Americans.^{1,3,4} At the request of the US Department of Agriculture, an Institute of Medicine committee convened in 2008 to prepare a report with updated recommendations for the nutrition standards and meal patterns.³ The Healthy, Hunger-Free Kids Act of 2010 required that the National School Lunch Program and School Breakfast Program meal patterns be revised based on the Institute of Medicine recommendations.⁵

To meet the daily food group recommendations of the Dietary Guidelines for Americans, the new meal patterns provide fruit, more vegetables (with specific subgroups required over a week), and whole grains, and now have minimum and maximum daily calorie levels averaged over a week^{6,7} (see Table 1). The previous nutrition standards did not have maximum calorie levels.⁶ In recognition of the difficulties associated with obtaining foods lower in sodium and

the sodium consumption level in the United States, a gradual reduction in the sodium content of the meals over 10 years was planned.³ Saturated fat was limited to $<10\%$ of total calories.³ Under the offer versus serve (OVS) selection rule, middle- and high-school students have to select three out of five meal components, but at least one must be a fruit or vegetable for the meal to count as a reimbursable meal.⁷ Previously, students only had to select three of the five meal components for the meal to count as reimbursable.⁶ OVS is optional for elementary schools but most use it. In cases where the school does not employ OVS, elementary school students have to take all components of the reimbursable meal.

Because the new standards and meal patterns were implemented during fall 2012, food waste, particularly of fruits and vegetables (F/V), has been a major concern.⁸ Other significant issues discussed widely include the proposed sodium reduction, the lack of whole-grain-rich foods that appeal to children, reduced student participation, and increased program costs.⁸

This commentary presents the early, published evidence on the effects of the new nutrition standards and meal patterns implemented during the fall semester of 2012. Changes in student food intake at lunch and in the foods available in the school food environment that supported improved student food intake were examined.

STUDENT DIETARY OUTCOMES

Five studies were found that assessed changes in student food intake as a result of the new meal patterns. All addressed F/V intake. Three studies reported changes in student F/V selection and consumption from 2011 or 2012 to postimplementation (fall 2012, 2013, or 2014) (Table 2).⁹⁻¹¹ All noted that more students selected fruit after the new meal patterns were implemented, but there was no change in the percent fruit consumed. In the Connecticut study that followed students for 2 years postimplementation,⁹ there was a significant decrease in the percent of students selecting vegetables between 2012 and 2013, but no change for 2014. However, there was a significant increase in vegetable consumption in 2014.⁹ The other two studies reported no difference in the percent of students selecting vegetables,^{10,11} although the Texas study reported significant changes in types of vegetable subgroups selected (more students selected other vegetables like green beans and fewer selected

Table 1. Previous and current (fall 2012) federal requirements for meal components and nutrients in school lunches⁶

Component	Before fall 2012 ^a	After fall 2012 ^b
Fruit	1/2-1 c combined fruit and vegetables	1/2-1 c
Vegetables	1/2-1 c combined fruit and vegetables No specific types required	3/4-1 c Specific subgroup amounts offered per week ^c
Milk	1 c	1 c
Milk fat	No fat/content restrictions	Fat-free flavored/unflavored or low-fat unflavored
Grains	1 oz	1-2 oz
Minimum/maximum	8-15 minimum/wk	9-12 maximum/wk ^d
Whole grains	Encouraged	All whole-grain rich by July 2014 ^e
Meat/meat alternates	1.5-2 oz 7.5-15 minimum/wk	1-2 oz 10-12 maximum/wk ^d
Calories	Kindergarten-grade 3: 633 kcal Kindergarten-grade 6: 664 kcal Grade 4-8: 785 kcal Grade 7-12: 825 kcal	Kindergarten to grade 5: 550-650 kcal (minimum and maximum) Grades 6-8: 600-700 kcal (minimum and maximum) Grades 9-12: 750-850 kcal (minimum and maximum)
Sodium	General goal to “reduce” sodium	3 Stage targets by grade level ^e
Trans fat	No limits	0 g/serving
Saturated fat	≤10% of total calories	≤10% of total calories

^aUnder the previous federal requirements for school lunch, School Food Authorities (SFA) could choose one of five approved approaches for menu planning. Three had nutrient requirements and did not specify portion size requirements. There were portion sizes in the two food-based menu planning approaches. The minimum ranges of portion sizes vary by grade group and menu planning approach. Under the offer vs serve policy required in high schools and optional for other schools, students may decline two of the five lunch components they are offered.

^bBeginning in school year 2012-2013, lunches must include both fruit and vegetable choices, and students must take at least 1/2 c fruits or vegetables with their lunches.

^cOver the course of the week, schools must offer all vegetable subgroups established in the 2010 Dietary Guidelines for Americans: dark green, red/orange, beans/peas (legumes), starchy, and “other” vegetables (as defined in the Dietary Guidelines).

^dChanges to the grains and meat weekly maximums: State agencies should consider any SFA compliant with the daily and weekly ranges for grain and meat/meat alternates in cases where documentation is compliant with the daily and weekly minimums (<http://www.fns.usda.gov/sites/default/files/2013-341030P.pdf> and <http://www.fns.usda.gov/extending-flexibility-meatmeat-alternate-and-grains-maximums-school-year-2013-14>). Also, school districts may currently operate at the 50% whole-grain-food rich level under a waiver from their state agency in cases where they wish (<http://www.fns.usda.gov/sites/default/files/cn/SP33-2016os.pdf>).

^eA potential change in this percentage and in the sodium targets may occur with the new reauthorization of the Healthy, Hunger-Free Kids Act.

starchy vegetables), and no difference in the amount of total vegetables consumed.¹⁰ In the Massachusetts study, significantly more of the vegetables selected were consumed postimplementation,¹¹ whereas significantly more red-orange vegetables but fewer legumes, were consumed in Texas, although there was no change in the percent of total vegetables consumed.¹⁰ The strengths of these three studies included objective measurement of student food selection, consumption, and waste; analyses conducted for those students who selected F/V; and analyses that controlled for student age, grade, ethnicity, school, and free or reduced-price meal status.

A Wisconsin study analyzed waste from 420 F/V items from student trays, adjusting for grade and school, and found no difference in the mean amount wasted between 2011 and 2013.¹² Between spring 2012 and spring 2013, a Vermont study also assessed changes in combined F/V selected, consumed, and wasted using the F/V items in the analyses and not individual student data.¹³ There was a significant increase in the mean amounts of combined F/V selected, a significant decrease in the mean amount consumed, and a significant increase in the mean amount wasted.¹³ These last

two studies also used objective measures of student selection and consumption. However, the analyses were conducted on mean amounts of F/V items selected, consumed, and wasted,¹² or combined F/V,¹³ but were not analyzed at the individual student level. One study adjusted the models for school and grade level,¹² one did not.¹³

There are important differences in these five studies. Four collected data from children in elementary schools (kindergarten through fifth grade),¹⁰⁻¹³ and two assessed changes among students in grades 6 through 8.^{9,11} The number of study schools ranged from two to 12. The majority of students in three studies were members of a racial minority,⁹⁻¹¹ whereas in two they were primarily white.^{12,13} All studies included information on the percentage of students eligible for free or reduced-price meals.⁹⁻¹³ A large percentage of students eligible for free or reduced-price meals were included in all studies. Data collection methods varied and included direct observation, digital photography, and weighed plate waste. All were validated, objective methods of dietary assessment.

Three studies used comparable methods, assessed changes at the individual student level,⁹⁻¹¹ and provided initial

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