

## Higher School-Meal Nutrition Standards Are Most Attractive to Low-Income and Time-Constrained Families

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### Key Facts

The Healthy, Hunger-Free Kids Act (HHFKA) placed strict nutritional requirements on food served at public schools.

Making school meals healthier attracted greater participation, especially among households that purchased the least healthy foods at the grocery store.

Policies warning households to avoid 'convenience' food may find greater success by helping them identify and access healthier (yet still convenient) alternatives.

In 2012, the Healthy, Hunger-Free Kids Act (HHFKA) placed strict nutritional requirements on food served at public schools. In a recent study, we explored whether changes to the healthiness of school meals led parents to substitute towards them, away from purchasing meals from supermarkets; and, if so, which households were more willing to do so. We noted a decrease in the quantity of food purchased for at-home consumption in response to the HHFKA, but little change in food quality. Consistent with substitution towards now-healthier school meals, much of this shift was attributable to products likely to be purchased for children and those traditionally associated with breakfast and lunch (the meals served at school). We found that substitution was mostly driven by households with smaller, less-healthy shopping baskets, and that these smaller shopping baskets likely reflected outsourcing meal preparation due to time constraints. Our findings suggest that there may be a segment of households seeking healthy and convenient food options not yet available to them, such as those provided by the HHFKA. Policies and programs geared towards warning households to avoid "convenience" food may therefore be more effective if focused on helping them identify healthy, convenient alternatives.

Signed into law in 2010, the HHFKA was a centerpiece of First Lady Michelle Obama's "Let's Move!" initiative to combat childhood obesity. Starting from the 2012-13 school year, minimum standards for foods served in school cafeterias became mandated, requiring the milk served in schools to be either fat-free or one-percent fat, and all grains to be whole-grain rich. Meal programs were stipulated to include fresh food items (such as fruits and vegetables) and healthier versions of other food items (minimum proportion of whole grains in processed foods). The policy also imposed mandatory maximums on unhealthy components such as sodium, sugar, and fat. To alleviate problems with overeating, portion sizes of meals were reduced.

In our study<sup>1</sup>, we explored, firstly, whether these new nutrition standards resulted in a shift towards school meals and away from grocery food purchase or vice versa; secondly, whether the shift towards or away from school meals changed the healthiness of households' grocery food shopping; thirdly, which types of households shifted the most towards school meals. With this third focus of our study, we sought to learn why certain households may have availed themselves of the opportunity to access healthier food for their kids in school.

### Measuring the Effects of Higher-Quality School Meals

Our data spanned the period from August 2011 through July 2013, and came from two sources: the NielsenIQ Consumer Panel and the individual item (Universal Product Code or UPC)-level nutrition label data provided by Label Insight. For our analyses, we used 43,220 households, including 7,645 treatment households (with school-age children) and 27,148 control households (without children).

We measured food quantity (calories per capita) using a household's total calories purchased in a given month, scaled by the number of "adult equivalents" in the household based on the typical calorie needs of children in the relevant age group(s) and also by the number of days in the month.<sup>2,3</sup> We measured food quality using scores from the UK's Nutrient Profiling Model.<sup>4,5</sup>

We used a difference-in-difference design to examine whether there was an overall substitution away from the grocery store (and towards school meals), or vice-versa, and whether there was an overall effect on the quality of grocery food purchases. We compared changes in grocery food purchases among households with school-aged children to the

1. Palazzolo, Mike and Hu, Zoey and Ailawadi, Kusum and Pattabhiramaiah, Adithya, School Nutrition Mandates and the Household Grocery Basket (February 24, 2023). Georgia Tech Scheller College of Business Research Paper No. 4398605. Available at SSRN: <https://ssrn.com/abstract=4398605> or <http://dx.doi.org/10.2139/ssrn.4398605>. Note: this is a previous version of the manuscript, due to be updated summer 2024.

2. Allcott, Hunt, Rebecca Diamond, Jean-Pierre Dubé, Jessie Handbury, Ilya Rahkovsky, and Molly Schnell (2019), "Food deserts and the causes of nutritional inequality," *The Quarterly Journal of Economics*, 134 (4), 1793-1844 Publisher: Oxford University Press.

3. Palazzolo, Mike and Adithya Pattabhiramaiah (2021), "The Minimum Wage and

Consumer Nutrition," *Journal of Marketing Research*, 58 (5), 845-869.

4. Poon, Theresa, Marie-Eve Labonte, Christine Mulligan, Mavra Ahmed, Kacie M. Dickinson, and Mary R. L'Abbe (2018), "Comparison of Nutrient Profiling Models for Assessing the Nutritional Quality of Foods: A Validation Study," *British Journal of Nutrition*, 120 (5), 567-582.

5. Dubois, Pierre, Rachel Griffith, and Martin O'Connell (2020), "How Well Targeted are Soda Taxes?" *American Economic Review*, 110 (11), 3661-3704

6. Wager, Stefan and Susan Athey (2018), "Estimation and Inference of Heterogeneous Treatment Effects Using Random Forests," *Journal of the American Statistical Association*, 113 (523), 1228-1242.

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corresponding changes among matched households without children. To characterize the types of households that reduced their quantity of grocery food purchases the most in response to the higher nutrition standards, we employed the causal forest method and estimate heterogeneous treatment effects.<sup>6</sup>

### Substitution Towards School Meals Greatest Among Low-Income Households

We found that, in response to the HHFKA's mandated nutrition standards, the average household decreased the calories per capita of food purchased at grocery stores by 6.4 percent. We found a similar decrease in the number of servings purchased per capita and a 4.4 percent reduction in grocery food spending per capita for these households. The average treatment effect for calories per capita of "kid-friendly" UPCs was more than three times the effect for other UPCs—roughly 10 percent versus 3.4 percent. Thus, the reduction in grocery food calories per capita was strongly driven by foods purchased for children. We found that treatment households reduced their calories per capita most for categories associated with breakfast and lunch (8.9 percent). These are the two meals that can be served at schools, though we find reductions in the other food categories as well.

Similarly, a (small) reduction in grocery quality was strongly driven by both kid-friendly UPCs, and breakfast and lunch categories, further suggesting that the changes to shopping basket purchases were driven by purchases for children. Treatment households purchased fewer of the healthier breakfast and lunch foods that they previously bought and instead opted to have their child get a healthy meal at school.

In which households did we note the greatest changes? Households with multiple children, that purchased fewer groceries at the grocery store prior to treatment, and that relied more on frozen meals, showed the largest negative treatment effects. This suggests greater substitution from grocery food to school meals for time-constrained households. Households with a low income, and thus higher levels of free and reduced-price school meal eligibility, were also associated with stronger (more negative) effects. Households that had, prior to the nutrition mandates, purchase the least healthy food at the grocery store also were associated with stronger (more negative) effects.

Substitution towards school meals was greater among households that may need the most help achieving a healthy diet—that is, households with fewer financial resources and a lesser propensity for buying healthy foods at the grocery store. The households most drawn to the healthier meals made available by the HHFKA were those who were likely

accustomed to outsourcing their meal preparation (as evidenced by their smaller pre-treatment quantity and other variables linked to time constraints), typically purchased less healthy food, and/or were financially constrained. One might expect that these households were already participating in the school meal programs, and that they might not have much room to further substitute away from the grocery store towards school meals (a ceiling effect). Instead, we found evidence consistent with a sizable substitution towards school meals by these households.

### Higher Nutrition Standards Made Meals Healthier and More Popular

Our results suggest that HHFKA led to a small but meaningful shift towards school meals, demonstrating that making the food available for consumption healthier, all else equal, can increase demand. HHFKA attracted greater participation from households for whom the pre-existing benefits (time savings and, for low-income households, cost-savings) of school meals were now coupled with an additional benefit: healthier food for their kids. Interestingly, the policy change did not predominantly attract households who were eating healthy food at home. Rather, we found more substitution away from grocery food among less educated households (who may have lower nutrition knowledge) and those who were previously purchasing less healthy grocery food.

Making school meals healthier attracted greater participation. For participating kids, any reduction in the healthiness of foods purchased at home was likely dwarfed by the healthiness of school meals. Substitution towards healthier school meals was stronger among households that purchased the least healthy foods at the grocery store, benefiting the kids who most needed healthier food. From a policy perspective, our findings suggest a significant win: HHFKA's revised nutrition standards not only made school meals healthier, they also made them more popular, even in the absence of expanded eligibility for free or reduced-price meals. Policy makers should consider these findings in future efforts to encourage households to adopt healthier diets.

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