Food Waste in a School Nutrition Program After Implementation of New Lunch Program Guidelines

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ABSTRACT

Objective: To assess the amount of food waste by meal components according to the new National School Lunch Program guidelines among pre-kindergarten and kindergarten students.

Methods: For 5 consecutive school days in 1 elementary school, the research team collected school lunch trays and separated meal components into bins relative to each food or beverage appearing on the school's daily menu. Bins were weighed in grams and converted to ounces and cups at the end of each lunch period.

Results: The researchers examined 304 meals from 1 pre-kindergarten class and 5 kindergarten classes. Of 4,988 oz of food and beverages served, 2,261 oz (45.3%) were wasted during 1 full school week, totaling 141 lb. The greatest amount of food waste was generated from vegetables, the main entree, and milk, respectively.

Conclusions and Implications: Strategies to reduce food waste in school lunch should be researched and implemented.

Key Words: National School Lunch Program, food waste, plate waste, nutrition, children (*J Nutr Educ Behav*. 2014;46:406-411.)

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INTRODUCTION

The National School Lunch Program (NSLP) is one of the largest federal food assistance programs operating in the US. Established in 1946 and administered by the US Department of Agriculture, the NSLP serves more than 31 million students each day across 100,000 schools, with $11.1 billion to administer in FY 2011.[1] In 2010, the Healthy Hunger-Free Kids Act[2] updated the meal patterns and nutrition standards for the NSLP (and the School Breakfast Program) to align with the 2010 Dietary Guidelines for Americans and in response to the Institute of Medicine Report on Nutrition Standards for Schools.[3] To "meet the nutrition needs of school children" and to "enhance the diet and health of school children, and help mitigate the childhood obesity trend," the NSLP began to implement significant changes during school year 2012–2013.[4]

The new standards aim to improve the nutritional quality of foods in schools, enhance nutrition education materials for parents, and expand eligibility for low-income children to enroll in school meals.[4] The revised NSLP guidelines focus on providing 5 meal components—fruits, vegetables, whole grains, low-fat dairy, and protein—with serving sizes and calories now based on age and grade level. The new guidelines also require a daily serving of fruit and vegetables, plus a weekly requirement for dark green, red/orange, beans/peas, starchy, and other vegetables. Under Offer Versus Serve guidelines, which is mandatory for high schools and elective for elementary and middle schools, students must select at least 0.5 cup of fruits and/or vegetables for schools to be in compliance and reimbursed.[4] The Healthy Hunger-Free Kids Act requires an increased federal reimbursement rate for school lunches by $.06 to help compliance with federal nutrition standards.[5]

Whereas public health advocates have applauded the new NSLP standards, the popular press implies that the new standards, in particular those related to fruits and vegetables, have led to increased levels of food waste.[6,7] These claims are based on anecdotal evidence, however, and not scientifically gathered data. The aim of this study was to assess the amount of food waste by food and beverage category within the NSLP among early elementary students (pre-kindergarten and kindergarten) to serve as a baseline assessment for future studies and as a reference point. To date, no research has been published to assess food waste as part of the new standards. Existing studies on school food waste are

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Figure. Sample of National School Lunch Program meal on Tuesday (left) and Wednesday (right).

based on previous standards and many focus on food waste of specific meal components (ie, fruits and vegetables) rather than the entire meal.[8-11] Furthermore, the studies have focused on older elementary and middle school audiences.[12,13] This age group represents a relatively new audience given their length of time and exposure to the NSLP. In addition, some research shows that younger children tend to waste more food.[8] Therefore, strategies to improve consumption and waste within the NSLP may be more effective within this age group. This age is also considered a critical stage in fostering food preferences for lifetime health.[14] In this study, food waste was defined as the quantity of edible food and beverage served as part of the NSLP and not consumed.

METHODS

Participants and Setting

One pre-kindergarten and 5 kindergarten classes (referred to as study classrooms) from a single public elementary school and attending for a full day were recruited to participate in the study. Preschool and pre-kindergarten are integrated onsite with the kindergarten through grade 5 public school system. All school lunches purchased by participants in the study classrooms were observed. Although the standards are not mandated for pre-kindergarten, the school adhered to the NSLP guidelines for this group. The eligibility for free and reduced price school lunch at the school was 48.93% for 2012–2013. The school was located in an urban cluster with a population of 21,030 individuals: 89.5% white, 6.2% black, and 2.2% Hispanic/Latino. It was located in a rural county in the southwest region of the US.[15]

Measures

Data collection occurred for 1 full week in March, 2013, to capture potential changes by day of the week and by menu offerings. Each day, school nutrition staff standardized, preweighed, and served each food item on a school lunch tray. The Figure shows samples of NSLP meals. Fruit and vegetable juices and milk were served in cartons. The research staff then weighed and recorded all menu items each day. An observation checklist was used to record which NSLP food and beverages were served to each student enrolled in the study classrooms and whether the meals actually met the NSLP guidelines for each food component. The research team validated that all requirements were met for fruits, vegetables, grains, meat/meat alternate, and milk. The county's menus were submitted to the Office of School Nutrition Programs, Department of Education in Virginia, for Certification of Compliance with the New Meal Pattern and Nutrition Standards. Each observational checklist was tailored to reflect the meal components of the day's specific menu. A food service production record was not available to record data about how many servings were taking served vs available. Researchers photographed meals to capture food quality and presentation. Researchers also recorded class size and number of NSLP school lunches served by class.

Food Waste Collection

To compute the amount of food waste, bins were prepared to collect food by each food and beverage appearing on the school's daily menu (main entree, fruit, vegetable, and milk). Table 1 shows the menu items served over a week. Fruit juice was collected in a bin separate from milk and fruits and then calculated within the fruit component of the meal. Before beginning collection, all bins were measured for tare weight. This school division's menus consistently combined meat and grains within the main entrees. Food waste from entrees that included any portion of vegetable (taco, chef salad, Asian chicken salad, and chicken fajita salad) was measured as a main entree. The elementary school used Offer Versus Serve guidelines for all study classrooms and in the entire lunchroom.[4] When students completed their meal, the research team collected school lunch trays and separated foods and beverages into their respective bins. The research team computed the edible potion of apples and plums by weighing the cores separately, averaging, and subtracting from mean fruit weight. Beverages were poured out of the cartons into the bins. At the end of each lunch period for each class, bins were weighed in grams and recorded by 2 independent research staff.

Ethics Approval, Data Collection, and Analysis

Based on school preferences, no personal information was collected from students. The Virginia Tech Institutional Review Board declared the study exempt, because no personal and/or identifying information was collected from participants, only meals and food waste. The school division, school nutrition director, and principal approved this study.

All food and beverage weights were collected and recorded using ZIEIS (Z15-EZS, Apple Valley, MN, 2013) digital scales (accurate to 5 g) in grams, then converted to ounces and cups using Microsoft Excel (version 14.0, Microsoft Corporation, Redmond, WA, 2010). Proportions of food wasted by amount of food served