Food Choice & Waste in Texas Middle School Cafeterias

Introduction & methods

During winter/spring 2011 researchers at the University of North Texas documented school meal choices by photographing lunch trays in two Texas middle schools in a district that participated in the National School Lunch Program (NSLP). The NSLP is a federally assisted meal program that provides cash subsidies and U.S. Department of Agriculture (USDA) foods to schools serving lunches that meet meal requirements which, at the time of the photo shoot, were based on meal components, such as vegetable or bread/grain, or on nutrient standards, such as number of grams (g) of protein or milligrams (mg) of calcium. The school district where the photo shoot took place used Nutrient Standard Menu Planning (NSMP) and routinely analyzed menus for nutritional compliance prior to service.

To match before/after images of lunch trays, address labels were coded and attached to the upper left corner of unused Styrofoam trays. Using three t-aerial camera apparatuses mounted on movable carts investigators snapped pictures of lunches on labeled trays as students exited the serving area. Images of trays were captured after students ate lunch by moving the apparatuses to a common doorway where students disposed of used trays and exited the cafeteria. Photographs were edited and archived as pairs on the University of North Texas Digital Library and analyzed using a Qualtrics™ online survey based on an image analysis protocol standardized by the researchers.

Photographic sessions took place during 7th grade lunch between January and April 2011. Six non-contiguous days of photo shoots were completed at school one, and five days at school two.

The study

Combined, the middle schools served an average of 364 lunches daily.

1,418 pairs of tray photos taken before and after lunch were analyzed

Demographics

58% of students receiving either free or reduced price lunches

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>White</td>
<td>42%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>41%</td>
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<tr>
<td>African American</td>
<td>13%</td>
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<tr>
<td>Other</td>
<td>4%</td>
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Dietary Guidelines for Americans 2010 (DGA) recommends choosing a variety of protein foods including seafood, lean meat and poultry, eggs, dried beans and peas, soy, and unsalted nuts & seeds.

School menus that remain the same day after day facilitate speed as the cafeteria staff becomes experienced in handling popular foods and students settle into routine food choice decisions, however, a static menu risks an unbalanced eating pattern that lacks the variety needed to compensate for nutrient inadequacies of favored foods.

At the time of the study, the NSLP minimum caloric level for lunches offered to students in grades 7-12 was 825 kilocalories (kcal) per day when averaged over a five-day week. Nutrition information available on the school district webpage was downloaded for comparison to requirements and the nutrient profile of each main dish item observed during the study was reviewed. Based frequency of appearance on photographed trays, a weighted mean of 364 kcal per serving was calculated indicating that the main dish provided 44.1% of required calories.

Example lunches:
- Pizza with fries, applesauce, and chocolate milk. 120.5% of target
- Pizza with fries, applesauce, and chocolate milk. 102.1% of target

Dietary Guidelines for Americans, 2010

Vegetable

Actual Choices

Starchy vegetables predominate with mashed potatoes, French fries and baked chips accounting for 79.3% of all vegetables on trays.

Recommended Choices

USDA Vegetables Food Group Pattern places 72% of dietary vegetables in the dark-green, legumes, red and orange, and other subgroups.

Vegetable Waste Comparison

Waste is significant for mashed potatoes, corn, carrots, beans, and green beans.

Details

In 2009 Condon, Crepinsek & Fox reviewed the third School Nutrition and Dietary Assessment Study (SNDA-III) and found a preponderance of starchy vegetables in school meals. Starchy vegetables are economical, easy to prepare foods that hold up well during service. Students hurrying though a busy cafeteria line select starchy vegetables out of habit making them the default vegetable of choice. While 81.9% of students ate all the French fries on their trays, less than half (42.5%) with mashed potatoes consumed the entire serving and fully a quarter (24.9%) ate none at all.

The USDA Vegetables Food Group is composed of five subgroups with a recommended pattern of 8% of dietary vegetables from the dark-green subgroup (such as broccoli or spinach); 8% from cooked dried peas and beans (legumes); 32% from red and orange (such as tomatoes or sweet potatoes); 24% from other (such as green beans or onions); and 28% from starchy vegetables (such as white potatoes or corn). (DGA p. 52) Condon et. al. found that a quarter (28%) of middle school menus included orange/dark green vegetables while 23% listed legumes. In the current study only 9.0% of vegetables photographed on lunch trays were from the dark green, red/orange, and legumes subgroups. Waste of these vegetables was noteworthy. Half or more of a serving remained on the tray 28.6% of the time for broccoli with cheese sauce (dark green); 57.4% for carrots (red/orange vegetable); 68.0% for pinto beans/ranch beans (legume); and 71.4% for green beans (other vegetable). Legumes stand out as excellent sources of fiber, B-vitamins, potassium, iron, and protein, and the poor showing of beans in this study is of concern.

Waste Varies with Item

59.4% of students finished their vegetables 14.3% of students wasted half or more of their vegetables
At the time of the study, schools meals planned using NSMP were required to include at least three items (entrée, side dish and fluid milk) on the menu. In addition, middle schools had the option of Offer Versus Serve (OVS), a system for serving lunches in which students were allowed reject one meal item as long as it was not the entrée. If more than three items were offered, student could refuse two items. As documented in the 2011 U.S. Youth Risk Behavior Surveillance Survey, 14.9% of Texas high school students reported eating no fruit during the seven days prior to completing the survey. In the current study, 23.7% of photographed lunch trays contained no fruit. Of those middle school students that did select fruit, just over half (54.4%) consumed all of it while a quarter (26.8%) ate none. Although fresh apple (22.3% of fruit selected) was the single most popular item, canned fruit accounted for 64.0% of all fruit observed on trays. Peaches (24.0%) were the most popular canned fruit followed by applesauce (22.4%), and fruit cocktail (22.1%). Although a quarter (26.8%) of the students who selected canned fruit ate all of it, 31.9% of those with fruit cocktail; 26.0% with pears; 24.5% with applesauce; 23.0% with pineapples; and 22.7% with peaches ate none at all. Over half of the apples (69.5%) were either not eaten or less than half consumed making apples a remarkable source of waste. DGA 2010 recommends increased consumption of fruits and vegetables noting that these foods are sources of nutrients that Americans typically under-consume such as folate, magnesium, potassium, dietary fiber, and vitamins A, C & K. While the majority of the students in the observed cafeterias did select fruit, the proportion wasted was noteworthy, particularly when compared to entrées. In addition, over a quarter of the students did not select any fruit at all.