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# Nutrition vs. Waste in School Menus

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Soup and salad may be popular with the business lunch bunch but not with the high school set. Studies on the National School Lunch Program (NSLP) show leftovers (plate waste) for soup averaged 22 percent, with vegetables and salads with a waste rate of 28 and 32 percent, respectively.<sup>1</sup>

Plate waste in school lunch programs over the last several years has attracted attention from a number of public interest groups as well as from the general public. But relatively few broad quantitative studies of plate waste in the NSLP

have been carried out. School feeding programs are given the responsibility by some to prevent obesity and by others to prevent malnutrition, especially among low income populations.

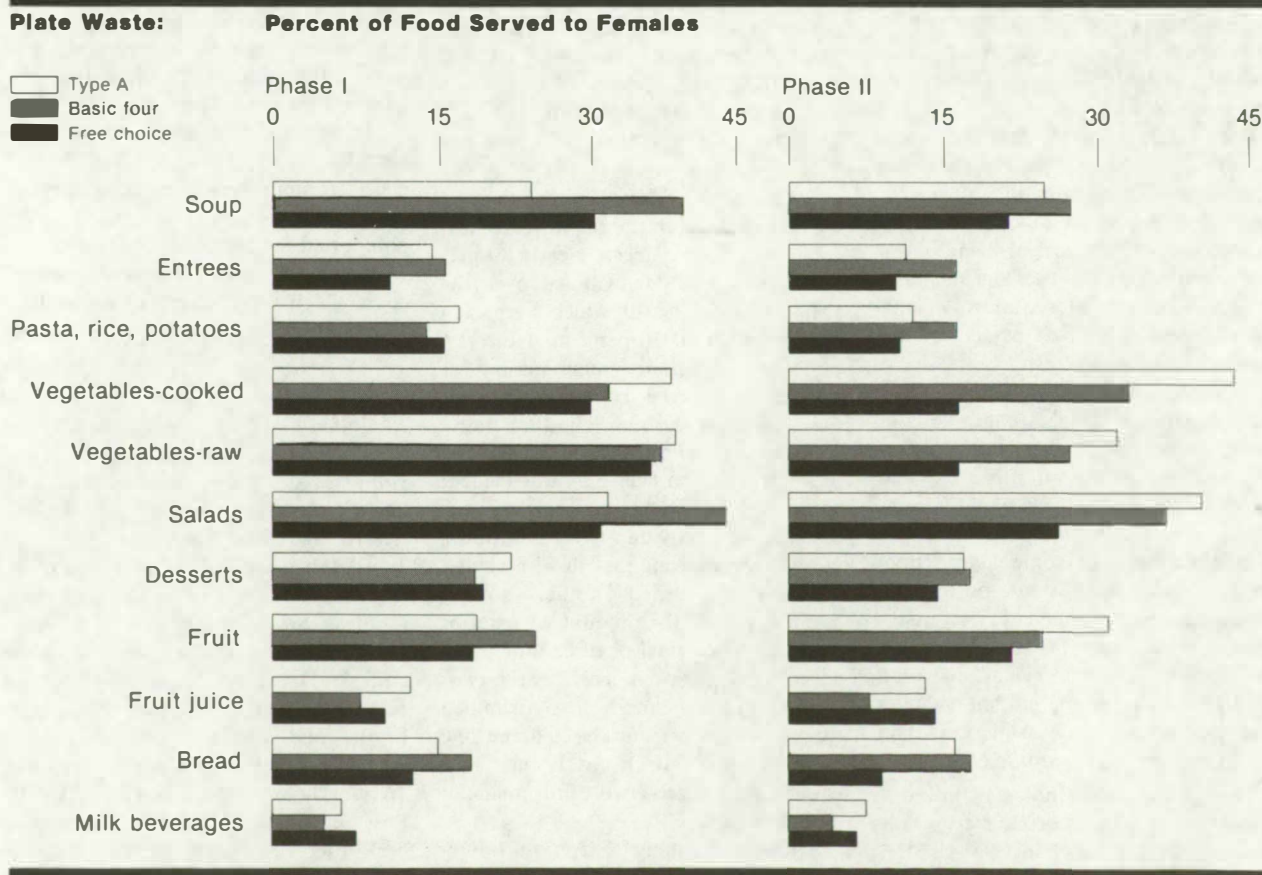
## Description

This study, conducted during the fall of 1977, compared three alternative menu planning methods with the now implemented Type A "Offer vs. Serve" pattern. In this offer-serve system, senior high school students are "of-fered" all five components of the Type

A meal (meat or meat alternate, bread, milk, fruit, and vegetables) but are only required to be served three. The alter-

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<sup>1</sup> A previous study (*National Food Review*, Fall 1979, NFR-8.) examined the effect of various methods of planning high school menus on student attitudes and meal costs.



nate menu planning methods compared with Type A "Offer vs. Serve" were: The Type A pattern requiring selection of all five components; "Basic Four" a variant of Type A; and free choice or a la carte items. The latter was the biggest departure from the traditional Type A.

In phase I of the study, 48 high schools all used the "Offer vs. Serve" system. In phase II, one-third of the schools reverted to the complete Type A pattern, one-third switched to "Basic Four" and one-third implemented a "free choice" system. Serving size and plate waste data

were collected during a 5-day period in each phase for a total of approximately 20,000 meals.

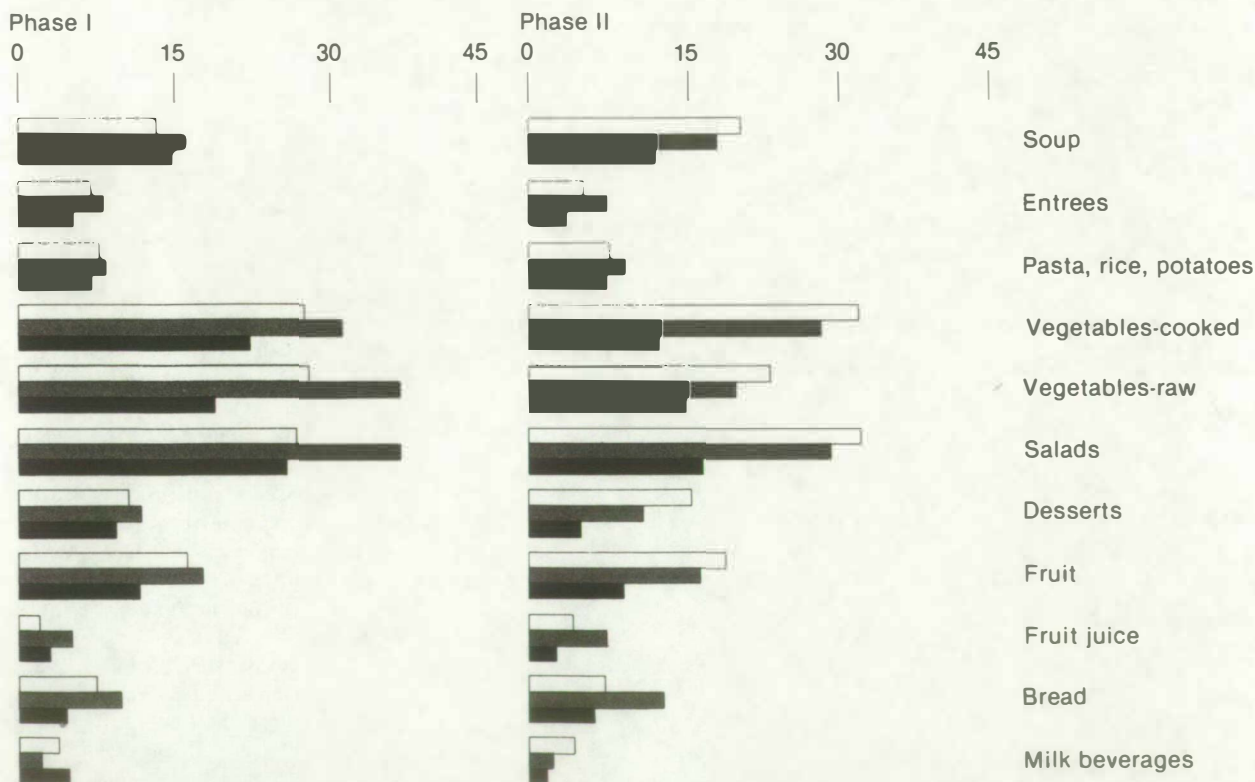
#### Plate Waste

Plate waste varied considerably depending on the menu item. Waste in main dishes was approximately 10 percent. Fruits were not particularly well consumed, with 20 percent left on the plates; however, only 8 percent of fruit juices served were discarded. Milk beverages were the most popular food category with waste only 5 percent.

When all foods served were examined, free choice significantly reduced plate waste for both boys and girls. Data demonstrate that excessive plate waste is not a general problem associated with all students and food categories. Instead, it is associated with particular menu items and subgroups of students. Total plate waste was nearly twice as high for high school girls as for boys.

Overall plate waste was 10 percent compared with 18 percent in a similar study carried out by Colorado State University in high schools in 1972/73.

#### Percent of Food Served to Males



### Nutrient Levels—Nutrient Goals

A school lunch is intended to provide one-third of the recommended dietary allowances (RDA's) established by the Food and Nutrition Board of the National Research Council for the appropriate age and sex groups.

For boys, food energy, iron, and thiamin were significantly below the nutrient goals in all age groups in both phases. In contrast, the levels of protein, calcium, phosphorus, vitamin A, riboflavin, niacin, and vitamin C all met or exceeded the nutrient goals.

For girls, iron was the only nutrient significantly below the nutrient goal for all age groups. All other nutrients except vitamin A were equal to or significantly higher than the goal. Vitamin A consumed in the free choice schools was below the nutrient goal in both phases, when students were served the Type A "Offer vs. Serve" system as well as free choice.

Nutrient requirements including energy are generally higher for boys than for girls at the high school level. For example, the RDA for energy is 3,000 kilocalories for boys and 2,100 for girls.

Corresponding allowances for thiamin are 1.5 and 1.1 milligrams, respectively. Even though boys waste less food than girls, they have a little more difficulty achieving the nutrient goals. However, it is not uncommon in school feeding for appropriate portion size adjustments to be made at the point of service. To the extent that large boys are given extra large portions, and smaller girls reduced portions, the differences in plate waste and achieving nutrient goals attributable to sex will be minimized.

### Nutritional Quality

It may not be realistic to expect that one-third of the daily energy and nutrient needs will be consumed in a school lunch, especially for boys since this means consumption of 1,000 kilocalories. Perhaps a more appropriate way to evaluate the nutritional quality of school meals is to compare nutrient levels per 1,000 kilocalories to nutrient goals based on the RDA's expressed in the same manner. When this is done it is apparent that the nutrient-to-calorie ratios in school meals are generally favorable. Since thiamin and iron are the two nutri-

ents most often deficient in school lunches, the increased levels of these two nutrients in 1977/78 as compared with the study in 1972/73 is encouraging, as is the slight downward trend in fat as a percentage of calories.

### Implications

Considering the nutritional value of free choice lunches as actually consumed, these lunches were as high in nutritional quality as the lunches in schools following Type A menu patterns. However, it is of some concern that the vitamin A, vitamin C, and iron levels in free choice lunches as consumed were at marginal levels, especially among girls. Also, the opportunity to select free choice lunches is likely to affect some students' food choices more than others. It is possible that the students in most need of a nutritionally well-balanced lunch would be the ones most likely to select and consume nutritionally less adequate lunches.

Finally, because of the inadequacies of food composition tables, the present analysis only considers nine "indicator" nutrients out of the approximately 40 nutrients considered essential for growth and good health. Until food composition tables are improved, the levels of all these nutrients in school meals cannot be evaluated.

Any implementation of free choice should be combined with a vigorous nutrient-based nutrition education program for students, food service workers, and lunch managers. Part of this program could be nutritional information in the lunchroom on the various menu items served.

A free choice system is a major change from the menu system that has served the National School Lunch Program for well over 30 years. However, in today's society, choice of food items is a reality for today's high school student. ■

### Nutritional Quality of Lunches as Consumed (2 Studies)

Nutrient	1977/8	1972/3	1977/8	1972/3	Nutrient Goal
	Nutrients/meal		Nutrients/100 Kcal		
Energy (Kcal) .....	710	717			
Protein (g) .....	29.1	31.0	41.0	43.2	20
Calcium (mg).....	438	436	617	608	471
Iron (mg) .....	4.3	4.1	6.1	5.7	7.1
Phosphorous (mg) .....	522	524	735	731	471
Vitamin A (mg) .....	1414	2018	1992	2814	1756
Thiamin (mg) .....	0.43	0.37	0.61	0.52	0.52
Riboflavin (mg) .....	0.79	0.76	1.11	1.06	0.64
Niacine-equivalents (mg) ..	10.8	10.9	15.2	15.2	6.7
Vitamin C (mg) .....	22.4	19.3	31.6	26.9	18
Percent fat calories .....	38.0	41.7	53.5	58.2	—