

# Meat/Meat Alternates in Middle School Menus: A Comparison

▪ Priscilla Conners, PhD, RDN, Darvika Dronavalli, MS candidate.

**KEYWORDS:** School lunch menus, beef, poultry, meat/meat alternate, National School Lunch Program, meal pattern, protein products

## INTRODUCTION:

### National School Lunch Program

The Richard B. Russell National School Lunch Act of 1946 established the National School Lunch Program (NSLP) which is a federally assisted meal program for children in public and nonprofit private schools and residential childcare institutions.<sup>1</sup> It is administered by the U.S. Department of Agriculture Food and Nutrition Services (FNS) which sets NSLP nutrition standards and establishes patterns for meals served to children. In 2010 the Healthy Hunger-Free Kids Act (HHFKA) introduced changes in a NSLP reimbursable meals with a goal to reduce health risks during childhood by providing meals that reflected the 2010 Dietary Guidelines for Americans.<sup>2</sup>

In 2012, school meals standards that emphasize nutrient dense meals high in recommended nutrients and moderate in calories were finalized.<sup>3</sup> These standards increased availability of fruits, vegetables, and whole grains, while providing choices in meat alternates such as mature beans, dry peas, tofu and soy yogurt. This signaled healthy changes in school meals, especially in the main dish.<sup>4,5</sup> In a 2020 study that quantified the dietary quality of hypothetical school meals consistent with HHFKA Initiatives, Patel et al. (2020) replaced processed and red meats with plant-based proteins and lean animal products.<sup>6</sup> This strategy improved diet quality by lowering saturated and total fat content. How prevalent, then, are meat alternate main dishes on school menus today and how does this compare to meals served prior to HHFKA? A comparison of current day lunch menus to archived lunch tray photos offers an opportunity to answer these questions.

School Nutrition Programs are required to serve meals that contain Meat/Meat Alternate (M/MA) in amounts consistent with meal pattern requirements and that are part of a main dish.<sup>7</sup> According to the National School Lunch Program (NSLP) meat dishes are 100% animal-based such as beef, poultry and fish. Cheese and yogurt are dairy foods that serve as meat alternates as do whole eggs. Meat alternates that are plant-based contain no animal meat. Examples include soy yogurt, dry beans and peas, tofu, tempeh, peanut butter and other nut or seed butters, and nuts and seeds.

The purpose of this review was to document the appearance of meat alternates in Texas middle school meals today and compare results to appearance on lunch photos recorded prior to HHFKA. Limiting document analysis of online menus to the same state where lunches were previously photographed recognized the role



that consistency in food preferences plays in making food choices and that those choices often are reflected school lunch menus.

## METHODS:

The University Internal Review Board reviewed the study protocol and determined that it was exempt from further review in accordance with 45 CFR 46.101 (b). To gain insight into main dish changes since implementation of HHFKA, current menus from Texas middle schools were reviewed and the main dishes evaluated for meat alternates. Results were compared a similar analysis of main dishes appearing on lunch trays photographed in two Texas middle school cafeterias in spring 2011.<sup>8,9</sup> The intent was to document the appearance of meat alternates on recent school lunch menus and compare results to those observed prior to HHFKA and answer the question: Do beef and poultry still dominate or are plant-based alternatives appearing?

## RESULTS AND DISCUSSION:

Online menus from 24 different school districts from five Texas Department of Agriculture Regions (TDAR) were selected for review.<sup>10</sup> This included five schools in Region 1 (West Texas), five in Region 2 (North Texas), four in Region 3 (Gulf Coast), five in Region 4 (South Central) and five in Region 5 (Valley). Low and high enrollments figures were as follows: Region 1, 98, 507 students, Region 2, 770, 1068, Region 3, 111, 826, Region 4, 161, 1432, and Region 5, 230, 1114. Two schools served the same menus for grades K–12, three for grades 6–12, 13 for grades 6–8, 1 for grades 5–8, four for grades 7–8, and 1 for grades 9–12. Six schools were operated by a Food Service Management Company (FSMC). A website evaluation of lunchtime menus took place during the week of October 21–25, 2024. All menus were from schools that participated in the National School Lunch Program (NSLP).

### Online Menu Analysis

A total of 120 middle school menus were accessed resulting in 244 main dishes observed. Several districts in the South Central and Valley Regions had a four-day school week and did not serve lunch on Fridays. School menus sometimes included more than one main dish. To avoid double counting the study focused on main dishes across the week rather than the number of times each appeared on a specific menu. An example is two main dishes with poultry, such as chicken sandwich and chicken nuggets, appearing on the same menu. This was recorded as a single poultry instance.

Beef and poultry appeared most days, indicating that these meats continued to be widely offered. Typical main dishes were cheeseburger, meat chalupas, chicken sandwich, chick wings, fajita tacos, steak fingers, and beef nachos. Chicken items were common, appearing at least three times during a five-day school week and in some instances every day. Beef appeared almost daily, underscoring its continued popularity. In terms of other meats, fish dishes were primarily observed in the North Texas Region.

Non-meat main dishes typically appear only one or two days per week with cheese pizza, being the most featured alternative. Dishes featuring plant-based alternatives, such as bean patty burger and bean/cheese burritos, were more prevalent in schools from the West Texas, North Texas and the Valley Regions. Menus in the North Texas Region included more non-meat dishes than those in the other four regions. In all six regions,



non-meat options such as cheese, eggs, and bean-based main dishes were less frequently observed than beef and chicken dishes.

### Archived Lunch Tray Images

Descriptive statistics were used to analyze 1,282 paired images of archived lunch trays to capture the meat/meat alternate in main dishes. All contained either beef, chicken or dairy with cheese pizza, chili cheese nachos, hamburger/cheeseburger and chicken nuggets appearing the most often. Beef dishes included hamburger/cheeseburger, bean and beef burrito, BBQ rib sandwich, and steak fingers. Poultry dishes included chicken nuggets, chicken sandwich, turkey chili and cheese nachos, chicken salad, and chicken fajita. No plant-based main dishes were observed that were not in combination with beef, poultry, or dairy. One main dish, beef and beans burrito, combined both meat and plant-based alternate. Pizza appeared on 33.4% of trays, turkey chili & cheese nachos on 16.8%, chicken nuggets on 14.0%, and hamburger/cheeseburger on 10.1%. The image analysis of archived lunch trays photographed in 2011 underlined past dominance of meat in main dishes, particularly beef and poultry, and the absence of plant-based options. An evaluation of 2024 menus revealed a continued reliance on beef and with cheese pizza and bean dishes serving as the leading non-meat alternatives.

**Table 1.** Archived Images: Main Dish by Meat Source, Appearance, and None Left (All Consumed) After Meal.

Main Dish (Entrée)	Meat Source	Number of Trays	None Left
Pizza (dairy, beef, pork)	Mixed	428	305
Chili & cheese nachos	Poultry	216	162
Chicken nuggets	Poultry	180	170
Hamburger/cheeseburger	Beef	129	116
Steak fingers	Beef	71	61
BBQ rib sandwich	Beef	55	41
Beef and beans burrito	Beef	54	49
Chicken crispito	Poultry	45	37
Chicken in sauce	Poultry	33	23
Chicken sandwich	Poultry	32	22
Chicken fajita	Poultry	24	8
Chicken salad	Poultry	15	8

**Table 2.** Meat Alternate (M/MA) by Appearance\* and Percent of Online Menus.

M/MA	Beef	Poultry	Other Meat	Cheese	Bean
Appearance	77	81	34	39	13
Percent (%)	31.6	33.2	13.9	16.0	5.3

\*The number of days that at least one main dish containing an M/MA was on a menu

## APPLICATIONS TO CHILD NUTRITION PROFESSIONALS:

### Conclusions

Moderate or significant challenges in the procurement of popular entrees such as pizza, burritos, chicken, and burgers were reported by the majority (74.2%) of responses to the 2024 *School Nutrition Trends Report*.<sup>11</sup> This presents an opportunity to explore new options that incorporate plant-based main dishes. In a 2019 study of plant-based entrées, Flores et. al found that elementary school students responded positively to new dishes that incorporated tofu, lentils and chickpeas.<sup>12</sup>

The School Food Authority Survey III cited continued high food costs as a supply chain challenge and an increase in scratch cooking and local food purchasing as a response.<sup>13</sup> Expanding main dishes to include plant-based choices has the potential to benefit both the school lunch program and its students through lowering operating costs as it meets nutrition standards.

### Limitations

The generalizability of results from a review of online middle school menus is limited to districts with similar characteristics, student demographics, and meal production resources. Conclusions drawn from this analysis of lunch tray images captured during a 2011 field study are limited by the uniqueness of the site where the photographs were taken.

**ACKNOWLEDGEMENTS:**

Research coordinated by the National Cattlemen's Beef Association, a contractor for the Beef Checkoff.

---

## ABSTRACT

### OBJECTIVE

The objective of this study was to report the frequency with which Meat and Meat Alternate (M/MA) protein sources appeared on archived school lunch tray images and to compare results to current trends in middle school lunch menus. The amount of beef, poultry, other meat, and non-meat components remaining on lunch trays images post-consumption was estimated to rank order main dishes based on appearance and potential for food waste. The range of M/MA alternate choices on present day school lunch menus was tabulated to gain insight into protein source trends for comparison.

### METHODS

Digitally archived middle school lunch tray images were systematically reviewed to document appearance of beef, poultry, other meat, and non-meat components with implications for planning healthy meals and moderating food waste in cafeterias. These images were the result of a 2011 field study conducted in two middle school cafeterias in Texas. Images were paired pre- and post-consumption to allow for estimation of the serving portion remaining at the end of a meal period. More recently, document analysis of online middle school menus in five Texas regions was conducted to observe trends in protein sources and compare results to main dishes photographed prior to implementation of the Healthy Hunger-Free Kids Act of 2010. In a foodservice setting the resources invested in producing M/MA choices are optimized when foods are consumed, and waste is minimized.

### RESULTS

Review of archived middle school lunch trays revealed a historic dominance of beef and chicken in main dishes and the absence of alternate protein products. A website evaluation of current day menus underlined a continued reliance on beef and poultry with the emergence of alternative protein sources such cheese and beans which are dairy and plant-based respectively.

### CONCLUSIONS AND IMPLICATIONS

The predominate of beef and poultry as the M/MA in middle school lunch main dishes continues with the appearance of dairy (cheese) and beans as alternate protein sources in current day menus.

## REFERENCES

- Connors, P. & Bednar, C. Middle school cafeteria food choice and waste prior to implementation of Healthy, hunger-free kids act changes in the national school lunch program. *Journal of Child Nutrition & Management*. 2015; 39(2).
- Documenting Plate Waste in Middle School Cafeterias Using Digital Still Photography in UNT Digital Library. University of North Texas Libraries. Accessed July 17, 2025. <https://digital.library.unt.edu/explore/collections/DPWMSC/>
- Flores, R., Eckart, J., & Nash, K. Implementation of vegan entrées in a Washington D.C. elementary School. *Journal of Child Nutrition Management*. 2019; 43(2).
- Healthy Hunger-Free Kids Act of 2010 Public Law 296, U.S. Statutes at Large 124 (2010): 3183-3266.
- Nutrition Standards for the National School Lunch and School Breakfast Programs. 70 Fed. Reg. 17, 4088 (January 26, 2012).
- Patel, K. J., Strait, K. M., Hildebrand, D. A., Amaya, L. L. & Joyce, J. M. Variability in dietary quality of elementary school menus with changes in National School Lunch nutrient standards. *Current Developments in Nutrition*, 4(9), nzaa138. doi.org/10.1093/cdn/nzaa138
- Richard B. Russell National School Lunch Act of June 4, 1946. 42 USC Ch. 13, §1751.
- School Nutrition Association. 2024 School nutrition trends report executive Summary. Accessed July 17, 2025. <https://schoolnutrition.org/resource/2024-school-nutrition-trends-report/>
- Texas Department of Agriculture. School Nutrition Programs Data, Food and Nutrition Division. Accessed July 17, 2025. <https://data.texas.gov/stories/s/TDA-Data-Overview-School-Nutrition-Programs/e2dm-5r4v/>
- Toossi, S., Todd, J. E., Guthrie, J., & Ollinger, M. The national school lunch program: Background, trends, and issues 2024 edition. U.S. Department of Agriculture, Economic Research Services Economic Information Bulletin No. 279: 2024. DOI: [10.22004/ag.econ.347312](https://doi.org/10.22004/ag.econ.347312)
- U.S. Department of Agriculture, Food and Nutrition Services. Revised: Crediting Tofu and Soy Yogurt Products in the School Meals Programs, CACFP, and SFSP. SP 02-2024, CACFP 02-2024, SFSP 02-2024. (November 29, 2023).
- U.S. Department of Agriculture, Food and Nutrition Service. USDA foods in school product information sheets – meat/meat alternates. Updated July 9, 2024. Accessed July 17, 2025. . <https://www.fns.usda.gov/usda-fis/product-information-sheets/meat-alternates>
- USDA Food and Nutrition Service. School food authority survey III on supply chain disruption and student participation. Updated February 28, 2025. Accessed July 17, 2025. <https://www.fns.usda.gov/research/schoolmeals/sfa-survey3-scd>