Nutrient quality of fast food kids meals[1–4]

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ABSTRACT

Background: Exposure of children to kids meals at fast food restaurants is high; however, the nutrient quality of such meals has not been systematically assessed.

Objective: We assessed the nutrient quality of fast food meals marketed to young children, ie, "kids meals."

Design: The nutrient quality of kids meals was assessed primarily by using criteria from the National School Lunch Program (NSLP). Analysis compared the nutrient values of meals offered by major fast food companies with restaurants in Houston, TX, with complete publicly available data. Data described every combination of meals offered in the target market. For each meal combination, the following were analyzed: total energy, percentage of energy from fat, total fat, saturated fat, sodium, total carbohydrates, dietary fiber, added sugars, protein, vitamin A, vitamin C, calcium, iron, energy density (food only), and the number of NSLP nutrient criteria met.

Results: Three percent of kids meals met all NSLP criteria. Those that met all criteria offered a side of fruit plus milk. Most were deli-sandwich-based meals. Meals that met the criteria had about one-third the fat, one-sixth the added sugars, twice the iron, and 3 times the amount of vitamin A and calcium as did kids meals that did not meet the criteria ($P \leq 0.001$). Meals that did not meet the NSLP criteria were more than 1.5 times more energy dense than those that did meet the criteria ($P < 0.001$).

Conclusions: Kids meals that met the NSLP criteria are uncommon and are lower in energy density. These meals may contribute to the nutritional status of children. *Am J Clin Nutr* 2008;88:1388–95.

INTRODUCTION

An important public health goal is to ensure a nutrient quality that is adequate and appropriate for children's optimal growth (1, 2). Adequate or optimal nutrient quality is the focus of several federal health policy guidelines such as *Healthy People 2010* (1), the *Dietary Guidelines for Americans* (2), and the National School Lunch Program (NSLP; 3).

Two trends motivate the need for an evaluation of the nutrient quality of fast food kids meals: the increased prevalence of childhood obesity (4) and the increasing proportion of daily food energy consumed away from home (5–8). The increasing secular trend of childhood obesity has resulted in a tripling of the prevalence of childhood obesity over the past 30 y (4). Simultaneously, increases in the energy contribution of away-from-home foods to children's diets have been dramatic, rising from 20% in the late 1970s to 32% in the mid 1990s (5). Several studies have shown that away-from-home foods contribute 30-42% of energy requirements and typically are less nutrient dense than are foods served at home (5–8). However, these analyses have not focused on children or foods specifically marketed toward children, such as kids meals.

Kids meals are fast food meals that are boxed or bagged often with a toy and marketed to young children. The meals were first introduced in 1979 (9). In 2007, 13 national and regional fast food companies in the United States offered kids meals. Marketing fast food meals to young children and offering promotions such as the inclusion of a toy that is part of a series to collect (10) introduces fast food at an early age and encourages regular consumption.

The Expert Committee convened by the American Medical Association concluded that there was consistent evidence that eating out at restaurants, particularly fast food restaurants, is a risk factor for obesity and should be limited (11). Foods consumed away from home, on average, contain more calories, total fats, saturated fats, cholesterol, sugars, and sodium and are served in larger portions than are foods consumed at home (5–8, 12, 13). National survey data also show that fast food consumers eat more fat, sugar, and soft drinks and less milk, fruit, and vegetables than do non–fast food consumers (5). Compared with other children, overweight children and adolescents consume more foods away from home (14). Given the nutrient excesses and deficiencies reported for children from recent national survey data, frequent consumption of fast foods could exacerbate marginal dietary intakes (15).

The aim of the present study was to examine the nutrient quality of fast food kids meals offered for sale to young children in a large metropolitan market. The study used nutrient standards

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for the US Department of Agriculture traditional food-based K-3 menu plan for the NSLP (16) as a standard by which to compare the nutrient quality of kids meals. Our primary research objective was the following: what percentage of kids meals offered in a local urban market meet NSLP standards appropriate for kindergarten to third grade? Related secondary research questions included *1*) what types of kids meals met and failed to meet NSLP standards and *2*) are kids meals that meet NSLP standards as energy dense as the meals that did not meet these standards?

METHODS

Selection of fast food restaurants

The availability of fast food kids meals is based on whether a company offers these meals and the concentration of the company's restaurants in the local market. The market-based method used in this analysis is similar to the method used to determine the local variability of healthy food choices (17–19) and the concentration of fast food advertising (20). For this study, the diet quality of kids meals was assessed in a local market, Houston, TX, the fourth largest city in the United States (21). The Public Health Departments for the City of Houston and Harris County, which are responsible for licensing restaurants, provided comprehensive lists of all restaurants in metropolitan Houston. After the lists were combined and duplications removed, Houston's fast food restaurants were found to include 12 national and regional fast food companies with kids meals. Phone calls to each local restaurant verified that 477 restaurants were in operation and offered the full variety of kids meals. From these phone interviews, it was possible to determine the local market exposure for each company. Local market exposure for a fast food company is the count of their restaurants divided by the total count of local fast food restaurants that offer kids meals (22). This measure differs from the standard economic definition of "market share," such as the Herfindahl Index (22), because it does not account for the number of meals each company sells locally. Rather, market exposure describes the relative presence for the company and its kids meals compared with the local availability of kids meals as a whole. The 12 fast food companies, the type of meals offered by each company, and the local market exposure are listed in **Table 1**.

Of the 12 fast food companies, 10 publicly provided all of the nutrition information necessary for the present analysis, with 1 company providing all information in each meal, except for micronutrients (23–34). Food and Drug Administration regulations (21CFR101.10; 2007) require that a restaurant provide nutrition information only if the restaurant makes a health or nutrient claim. Companies may provide nutrition information to consumers by any reasonable means (35), but the information must represent the nutrients for the food amount customarily consumed per eating occasion (21CFR101.9; 2007). Required nutrition information includes total calories, percentage of calories from fat (% kcal), total fat (g) and saturated fat (g), cholesterol (mg), sodium (g), total carbohydrates (g), dietary fiber (g), sugars (g), protein (g), vitamin A [% Daily Value (%DV)], vitamin C (%DV), calcium (%DV), and iron (%DV) (36). Thus, the nutrient and food analyses could be performed for the following fast food companies: Arby's, Burger King, Chick-fil-A, KFC, McDonald's, Sonic, Subway, Taco Bell, Wendy's, and Whataburger.

Procedures

Fast food companies promote uniformity in terms of the individual choices, size, and nutrients and uniform food safety standards (37). Yet, within each fast food company, there are variations of kids meals so that a parent or child can choose from

TABLE 1
Types of kids meals offered, availability of nutrient data, and local market exposure by fast food company[1]

	Type of Meal					
	Burger[2]	Chicken[3]	Deli[4]	Other[5]	Nutrition data available?	Market exposure in Houston
Companies included in the analysis						
Arby's	—	—	x	—	Yes	<1
Burger King	x	x	—	—	Yes	9
Chick-fil-a	—	x	—	—	Yes	2
KFC	—	x	—	—	Yes	5
McDonald's	x	x	—	—	Yes	19
Sonic	x	x	—	x	Yes	7
Subway	—	—	x	—	Yes	17
Taco Bell	—	—	—	x	Yes	7
Wendy's	x	x	x	—	Yes	7
Whataburger	x	x	—	—	Yes	8
Companies not included in the analysis						
Jack in the Box	x	x	—	—	Yes[6]	12
Quiznos	—	—	x	—	No[7]	7

[1] Houston market exposure is the total number of fast food restaurants in Houston for a given fast food company divided by all restaurants in Houston for the 12 fast food restaurant companies ($n = 477$). Due to rounding, column does not add up to 100%.
[2] Includes hamburgers and cheeseburgers.
[3] Includes chicken nuggets, strips, popcorn chicken, drumsticks, and fried chicken sandwiches.
[4] Includes ham, turkey, roast beef, and tuna sandwiches.
[5] Other offerings include tacos, cheese dogs, and cheese sandwiches.
[6] Company did not provide information on micronutrients.
[7] Company did not provide any information.

different sandwiches or entrées, different side dishes, and different beverages. Based on this variety, a database was prepared with the nutrient information for all possible kids meal combinations offered at each of the 10 fast food restaurants for which nutrient data were available. If the company offered chicken (nuggets or tenders) with sauce choices, then meal combinations of chicken with no sauce and chicken with each type of sauce were included. If the company permitted choice of bread in a sandwich and inclusion or omission of cheese, then meal combinations of every possible bread type and cheese or no cheese were analyzed. These procedures generated a database of 1146 combinations of kids meals for the 10 fast food companies in the present study.

Preparation of the nutrient data from kids meal combinations for analysis included validation; converting data from percent Daily Values (38) to their gram, microgram, or milligram amounts; and estimating the amount of added sugar in each meal combination by using the US Department of Agriculture nutrient database (39). The nutrient information that the fast food companies made publicly available in July 2007 was compared with equivalent foods from several sources: the US Department of Agriculture's National Nutrient Database (40), the 18 000-item food databases of the Nutrition Data System for Research (NDS-R; version 5.0_35, 2004) developed by the Nutrition Coordinating Center (University of Minnesota, Minneapolis, MN), and food company websites (for brand name foods offered in the meals). Three dietitians confirmed that the data and nutrient values were consistent within ±10% with each company's posted values. Overall, data from the fast food companies were consistent with the nutrient data from all external sources.

Nutrient quality evaluation

The current Nutrient Analysis Protocol of the NSLP (16) offers several ways that the nutrient quality of school lunches can be evaluated. The Nutrient Analysis Protocol, which is based on the 1995 Dietary Guidelines, is still accepted as a tool to measure the nutrient adequacy of meals prepared for children of this age group and is the most adaptable to evaluate kids meals (16). These nutrient standards of the NSLP assist school food service staff in the determination of whether the weekly average of school meals meets the nutrient minimum levels for calories, protein, calcium, iron, vitamin A, and vitamin C and the maximum levels for the percentage of calories from total fat and saturated fats. One NSLP standard, the minimum recommended energy allowance, is part of the Nutrient Analysis Protocol but not used in this study because of health concerns for excess energy intakes. Sodium, dietary fiber, added sugars, and *trans* fats are not part of the NSLP standards, but because of public health concerns for excess intakes of sodium, added sugars, and *trans* fats as well as insufficient intake of dietary fiber (2), these nutrients were added to the nutrient spreadsheets for analysis in this study. Added sugar includes sweeteners (eg, sugars, mono- and disaccharides, syrups, honey, molasses, etc) used as an ingredient in a multi-ingredient food and juice concentrates used as an ingredient but not reconstituted (39). *trans* Fats include natural *trans* fats from animal foods, ≈20% of total fats, but excludes conjugated linoleic acid (2).

Finally, because of increasing interest in the energy density of foods as relating to increased energy intakes, risk of obesity (41–44), and the metabolic syndrome (45), the energy density of various kids meal combinations was calculated. The nonbeverage energy density was calculated by dividing the total energy of the kids meal combination by the total gram weight of the meal; all beverages were excluded from this calculation. We excluded beverages because nonbeverage energy density has been consistently associated with higher obesity or adiposity in population-based studies among children (46) and adults (41–43, 45, 47). To date, no ideal cutoff or standard for a healthy energy density for foods exists for children this age, but comparisons among meal combinations can be made (48). A key recommendation of the *Dietary Guidelines for Americans* is to consume nutrient-dense foods and beverages from foods that limit the intake of saturated fats, added sugars, and salt (2). Meeting recommended nutrient intakes within energy needs supports the use of energy density to evaluate kids meals.

Data analysis

The data analysis for this article was generated by using SAS software, version 9.13 of the SAS System for Windows (SAS Institute Inc, Cary, NC). Descriptive statistics for the nutrient guidelines like the mean and SDs, as well as values at major percentile cutoffs, were run for all kids meal combinations on the basis of typical kids meals portion served. Using a local market exposure measure, data were weighted to reflect the concentration of these meals in the Houston area. From the weighted number of kids meal combinations offered in Houston in summer 2007 (n = 51 040), those that met the recommended nutrient guidelines were compared with those that did not. Student's t tests were used to test the hypothesis that the differences in meeting the NSLP and other guidelines were equal to zero at $P \leq 0.001$.

RESULTS

The descriptive nutrient data for all kids meal combinations are shown in **Table 2**. The first set of nutrients analyzed were the 7 that make up the NSLP guidelines. More than one-third of the fast food kids meal combinations provided <30% of energy from fat; more than two-thirds provided <10% of energy from saturated fat. Most provided adequate protein. Less than one-third of the meals provided adequate calcium and iron. The average iron from kids meal combinations was low at 2.2 ± 1.4 mg. Although more than one-half the kids meal combinations provided adequate vitamin C, <20% provided adequate vitamin A. Only 3% of the kids meals met all 7 NSLP guidelines.

With respect to the other guidelines, more than one-half of the meals exceeded the recommendation for sodium. The average fiber provided in kids meals was low, 3.0 ± 1.9 g, with <1% providing 8.3 g fiber. Added sugars averaged 16.8 ± 11.8% of energy, but some meals were prepared with 51.6% of energy from added sugars. Less than 25% of the meals met the guideline for *trans* fat, although *trans* fat is found naturally in animal foods and is produced in the hydrogenation of plant oils (2). The average energy of all meals was 526.7 ± 133.6 kcal. If these kids meals represented one-third of the daily calories consumed, the average energy offered is higher than one-third of the energy needs for the younger, less-active children in this age group. Mean nonbeverage energy density for kids meals was 2.3 ± 0.7 kcal/g food, with large variation between the minimum and maximum.

TABLE 2
Descriptive nutrient information for all kids meal combinations and the percentage meeting the National School Lunch Program (NSLP) and other guidelines based on typical kids meal portions served

		Percentile						
	Mean ± SD	Min	Max	25th	50th	75th	90th	95th
NSLP guidelines[1]								
Total fat (% of total energy)[2]	32.6 ± 10.3	5	63.8	24.7	34.5	39.3	44.7	47.9
Saturated fat (% of total energy)	8.9 ± 3.0	0	18	6.8	8.6	10.8	12.9	14.0
Protein (g)	16.2 ± 5.5	7	33	12	16	19	24	28
Calcium (mg)	197.1 ± 167.5	0	707	60	152	300	420	612
Iron (mg)	2.2 ± 1.4	0.4	6.5	1.08	1.82	2.96	4.32	4.86
Vitamin A (μg)	97.3 ± 87.8	0	480	30	60	150	225	270
Vitamin C (mg)	73.3 ± 84.9	1.2	283	4.8	25.2	118.2	189.6	247.2
Other guidelines[3]								
Sodium (mg)	862.9 ± 288.4	340	1960	665	810.1	1011	1251	1530
Fiber (g)	3.0 ± 1.9	0	9	2	3	5	6	6
Added sugar (% of total energy)	16.8 ± 11.8	0	51.6	5.4	16.8	25.0	33.0	37.9
trans Fat (g)[4]	2.2 ± 2.0	0	8.5	0.5	1	4	4.5	4.5
Other								
Weight (g)	418.8 ± 105.8	129	686	401	440	482	536	562
Energy (kcal)[2]	526.7 ± 133.6	180	880	425	530	620	710	740
Nonbeverage energy density (kcal/g food)	2.3 ± 0.7	1	3.5	1.7	2.3	2.9	3.0	3.1
Total fat (g)	19.8 ± 9.2	2	45.5	10.5	22	26	31	35
Saturated fat (g)	5.4 ± 2.8	0	14	3.5	5	7	10	11
Cholesterol (mg)	34.6 ± 11.8	5	90	25	35	40	55	55
Carbohydrates (g)	71.2 ± 18.6	18	119	59	72	85	95	102
Total sugar (g)	35.6 ± 14.9	0	78	27	37	46	55	56
Total sugar (% of total energy)	28.3 ± 13.0	0	63.7	20.8	26.9	38.2	45.6	50.3
Added sugar (g)	22.4 ± 16.1	0	61.7	7	21	38	43	50
Percentage of total kids meals meeting NSLP guidelines (n = 51 040)								
Energy from total fat ≤30% of total energy (%)	37.2 ± 48.3	—	—	—	—	—	—	—
Energy from saturated fat <10% of total energy (%)	67.2 ± 46.9	—	—	—	—	—	—	—
≥9 g of protein (%)	95.5 ± 20.7	—	—	—	—	—	—	—
≥267 mg calcium (%)	27.4 ± 44.6	—	—	—	—	—	—	—
≥3.30 mg iron (%)	20.5 ± 40.4	—	—	—	—	—	—	—
≥15 mg vitamin C (%)	55.0 ± 49.7	—	—	—	—	—	—	—
≥200 μg of vitamin A (%)	17.7 ± 38.2	—	—	—	—	—	—	—
Meets all 7 conditions (%)	3.0 ± 17.1	—	—	—	—	—	—	—
Percentage of total kids meals meeting other guidelines (n = 51 040)								
≤800 mg sodium	48.9 ± 50.0	—	—	—	—	—	—	—
≥8.33 g fiber	0.3 ± 5.0	—	—	—	—	—	—	—
Energy from added sugar ≤25%	75.6 ± 42.9	—	—	—	—	—	—	—
0.0 g *trans* fat	23.4 ± 42.3	—	—	—	—	—	—	—

[1] US Department of Agriculture (20).
[2] In kcal (100 kcal = 0.4184 MJ).
[3] US *Dietary Guidelines for Americans* (2).
[4] Processed foods and oils provide ≈80% of *trans* fats in the diet, compared with 20% that occur naturally in food from animal sources (2). Conjugated linoleic acid was excluded from the definition of *trans* fat.

In **Table 3**, the kids meal combinations that met the recommended nutrient guidelines are compared with those that did not. Of the 51 010 possible fast food kids meal combinations, 1462 (3%) met all NSLP guidelines. Those kids meal combinations that met the guidelines had a nonbeverage energy density of 1.5 ± 0.3 versus 2.3 ± 0.6 kcal/g for those that failed the NSLP criteria. Meals that met the criteria had about one-third the fat of the meals that did not meet the criteria. Other differences were that the kids meal combinations that met the NSLP guidelines had only about one-sixth the amount of added sugars, but twice the iron and 3 times the amount of vitamin A and calcium as did those kids meal combinations that did not meet the guidelines. Total fat and added sugars, but not total sugars that included those in dairy foods and fruit, resulted in a notable nutrient dilution effect in those meals that did not meet the NSLP guidelines.

All of the kids meals that met the NSLP guidelines included fruit as a side dish and milk as a drink (Table 3), and nearly all were deli-sandwich-based meals. Nevertheless, not all meals consisting of a deli sandwich, fruit, and milk met the NSLP standard. Fifty-one percent of the kids meals that did not meet the NSLP guidelines were chicken-based meals, 28% were burger-based meals, 10% were deli-sandwich-based meals, and 11% were based on another entrée or sandwich. Of the meal combinations not meeting the NSLP guidelines, 51%

TABLE 3
Nutrient information for kids meals, type of kids meals, and kids meal combinations that met all National School Lunch Program (NSLP) guidelines versus those that did not on the basis of typical kids meal portions served[1]

	Met NSLP guidelines (n = 1462)	Did not meet guidelines (n = 49 498)
NSLP guidelines[2]		
Total fat (% of total energy)[3]	13.3 ± 2.0	33.1 ± 9.9
Saturated fat (% of total energy)	7.8 ± 1.4	8.9 ± 3.1
Protein (g)	28.9 ± 1.8	15.7 ± 5.1
Calcium (mg)	631.7 ± 74.1	184.3 ± 151.6
Iron (mg)	4.6 ± 0.7	2.1 ± 1.3
Vitamin A (μg)	275.2 ± 12.4	92.1 ± 83.5
Vitamin C (mg)	64.5 ± 12.8	73.6 ± 86.2
Other guidelines[4]		
Sodium (mg)	994.8 ± 116.7	856.4 ± 290.9
Fiber (g)	3.4 ± 0.6	3.0 ± 2.0
Added sugar (% of total energy)	3.4 ± 3.1	17.2 ± 11.7
trans Fat (g)	0.0 ± 0.1	2.2 ± 2.0
Other		
Weight (g)	561.6 ± 18.3	416.2 ± 107.1
Energy (kcal)	483.6 ± 44.1	527.9 ± 135.1
Nonbeverage energy density (kcal/g food)	1.5 ± 0.3	2.3 ± 0.6
Saturated fat (g)	4.2 ± 0.7	5.5 ± 2.8
Sugar (g)	49.2 ± 10.1	35.2 ± 14.8
Added sugar (g)	4.1 ± 4.1	23.0 ± 16.1
Type of kids meals (% of meals within group)		
Burger-based meal	2.4 ± 15.0	27.9 ± 44.9
Chicken-based meal	0.0 ± 0.0	50.8 ± 50.0
Deli-sandwich-based meal	97.7 ± 15.1	10.4 ± 30.5
Meal with other entrée	0.0 ± 0.0	10.8 ± 31.1
Meal includes fried potatoes	0.0 ± 0.0	50.7 ± 50.0
Meal includes fruit	100.0 ± 0.0	43.3 ± 50.0
Meal includes other type of side	0.0 ± 0.0	5.9 ± 23.6
Meal includes flavored or unflavored milk	100.0 ± 0.0	22.4 ± 41.7
Meal includes 100% juice	0.0 ± 0.0	15.4 ± 36.1
Meal includes diet drink/tea without sugar	0.0 ± 0.0	16.1 ± 36.7
Meal includes sweetened beverage (soda)	0.0 ± 0.0	46.1 ± 49.8
Kids meals meeting NSLP guidelines (% of meals within group)		
Energy from total fat ≤30% of total energy	100.0 ± 0.0	35.3 ± 47.8
Energy from saturated fat <10% of total energy	100.0 ± 0.0	66.2 ± 47.3
≥9 g protein	100.0 ± 0.0	95.4 ± 21.0
≥267 mg calcium	100.0 ± 0.0	25.2 ± 43.4
≥3.30 mg iron	100.0 ± 0.0	18.2 ± 38.6
≥15 mg vitamin C	100.0 ± 0.0	53.7 ± 49.9
≥200 μg vitamin A	100.0 ± 0.0	15.3 ± 36.0
Percentage of kids meals meeting other guidelines (% of meals within group)		
≤800 mg sodium	0.0 ± 0.0	50.3 ± 50.0
≥8.33 g fiber	0.0 ± 0.0	0.2 ± 5.1
Energy from added sugars ≤25% of total energy	100.0 ± 0.0	74.7 ± 43.7

[1] All values are mean ± SD. t test analysis was conducted that tested the hypothesis that the nutrient value of the meals that met the NSLP guidelines was equal to the nutrient value of the meals that did not meet the guidelines. For all nutrients reported, t test results rejected the hypothesis at $P < 0.001$.
[2] US Department of Agriculture (20).
[3] In kcal (100 kcal = 0.4184 MJ).
[4] US *Dietary Guidelines for Americans* (2).

included fried potatoes and 46% included a sweetened beverage.

The shortfall nutrients that limited kids meals from meeting the NSLP guidelines were total fat, calcium, iron, and vitamin A. Of kids meals that did not meet the NSLP guidelines, >65% exceeded guidelines for total fat, whereas 75% were deficient in calcium, 82% were deficient in iron, and 85% were deficient in vitamin A.

Chicken-based kids meal combinations were those that provided the lowest and highest amounts of energy (data not shown). Those with the lowest energy included fruit and a diet beverage and those chicken-based kids meals with the highest included fries and a sweetened beverage. The meal combination with the lowest calories from fat and saturated fat was a deli sandwich with fruit and juice (20% kcal from fat), and the meal with the most energy from total fat and *trans* fat was a chicken-based meal

with fries and whole milk. The meal combinations highest in added sugar (62 g) were chicken-based meals with sweet dipping sauce, sweetened fruit, and sweetened beverage. The meals with the most dietary fiber (9 g) contained bean burrito entrées. Meals highest in calcium (707 mg) and iron (6.5 mg) were deli sandwiches with cheese, fruit, and milk. Chicken meals with fries made up most of the meals highest in sodium.

The percentage of meals that met a given guideline for each major meal type (eg, hamburger, chicken, deli sandwiches, and other entrée), the percentage of meals that met the 7 NSLP guidelines, and those that did not meet any are listed in **Table 4**. Burger-based meals on average met nearly 3 of the guidelines with 0.2% of the meals meeting all 7 guidelines. The protein guideline was met by every hamburger meal. For the remaining guidelines, <50% of hamburger meals met a given guideline. The guideline with the smallest percentage of hamburger meals was the guideline for vitamin A. Nearly all chicken-based meals met the protein and saturated fat guideline and >50% met the vitamin C guideline. Six percent of chicken-based meals and <1% of these meals met the guidelines for vitamin A and iron, respectively. The average number of guidelines met by other entrée-based meals was the lowest of the 4 major types (2.1), and 13% of the meals met none of the guidelines. Only 57% of the meals met the protein guideline. Conversely, 22% of the deli-sandwich-based meals met all 7 guidelines, with the average number of guidelines met slightly higher than 5 out of 7. Note that at least 50% of the deli sandwich meals met a given guideline, with 4 of the guidelines (eg, energy from saturated fat, protein, iron, and vitamin C) met by at least 85% of the deli sandwich meal offerings.

DISCUSSION

This report is the first to characterize and compare the nutrient quality of all combinations of fast food kids meals in a major metropolitan market. Our findings showed that a small percentage (3%) of kids meals offered in the Houston market met the NSLP nutrient guidelines. Meals that failed to meet the NSLP guidelines included meals based on fried chicken and meals with fries, juice, or sweet beverages, supporting the higher fat and sugar intakes that Bowman et al (5) found in diets of children eating fast foods. Such findings add support for the recent evidenced-based recommendations on the Assessment, Prevention and Treatment of Child and Adolescent Overweight and Obesity from the expert committee convened by the American Medical Association that recommended limiting eating out at restaurants, particularly fast food establishments (11). Of all the kids meals that met the NSLP guidelines in the present study, all included some type of milk as a beverage and fruit as a side dish and almost all were deli-based sandwiches. Kids meals that met NSLP criteria had higher nutrient quality and provided 2–3 times the amounts of iron, vitamin A, and calcium but only one-sixth the amount of added sugars. Thus, food choices are available for some kids meals that can achieve a widely accepted level of nutrient quality.

The choice of main entrée (burger, chicken, etc) did not, by itself, greatly influence the nutrient content of the typical meals offered, but the side choices did. Deli sandwiches with fruit and milk represented only 6% of all kids meals offered in Houston, but approximately one-half of these types of kids meals (53%) met the NSLP standards (data not shown). Raisins appeared to be the most nutritious fruit side because of their high iron content. Meals that failed to meet the NSLP standard did so because of the share of energy from fat and the low quantity of calcium, iron, and vitamin A. The findings from this study of average fast food meals for kids offered in a major metropolitan market are consistent with what others have reported on fast food consumption from national surveys (5–7).

This report is also the first to characterize the nonbeverage energy density of fast food kids meals. Compared with a previous large-scale epidemiologic report, the energy density (food only, no beverages) of the kids meals was ≈1.5 times greater than a typical 3–9-y-old child's dietary energy density obtained by three 24-h dietary recalls (49). Clearly, a measure of nonbeverage energy density from a meal is not the same as a measure based on 3 d of food, but pediatric food energy density data are limited. Also, kids meals that did not meet the NSLP criteria were more than 1.5 times as energy dense as those that did meet the criteria. These findings are consistent with a study that compared the energy density of 3 popular fast food outlets with adults' typical diets and reported that fast food meals had more than a 1.5-fold

TABLE 4
National School Lunch Program (NSLP) guidelines met by type of kids meal on the basis of typical kids meal portions served[1]

NSLP nutrient guideline met	Percentage of meals			
	Burger-based meals	Chicken-based meals	Deli-sandwich-based meals	Other entreé-based meals
			%	
1) Energy from total fat ≤30% of total energy	36.7	34.6	78.3	2.4
2) Energy from saturated fat <10% of total energy	31.8	90.7	87.9	32.9
3) ≥9 g protein	100.0	100.0	100.0	57.3
4) ≥267 mg calcium	20.1	21.2	50.0	48.8
5) ≥3.30 mg iron	29.0	0.2	94.1	4.9
6) ≥15 mg vitamin C	47.5	59.9	84.5	18.9
7) ≥200 μg vitamin A	11.8	6.2	51.0	47.0
Met 7 guidelines	0.2	0.0	21.6	0.0
Did not meet any guidelines	0.0	0.0	0.0	12.8
Average number met	2.7	3.1	5.4	2.1
SD	1.4	1.1	1.1	1.2

[1] NSLP guidelines are from the US Department of Agriculture (20).

increase in energy density (47). Because high-energy-dense diets have been linked previously to higher energy intakes, obesity (41–44), and the metabolic syndrome (45), our findings provide further support for choosing healthier kids meals or simply limiting children's consumption of such meals.

Because nearly 25% of children aged 4–8 y consumed fast food on a typical day according to national survey data (5), the diet quality of kids meals offered likely contributes significantly to the nutritional status of children. A strength of this study was the use of publicly available data from the fast food companies (23–34). Additionally, these data were validated by double-checking them with additional sources of nutrient information. It should be noted that the NSLP program can be evaluated by using one of several sets of guidelines, and the guidelines used in the present study were the ones most lenient for micronutrients (16) and energy minimums were excluded. With the inclusion of the minimum recommended energy allowance (633 kcal) as a criterion, no kids meals would have met the NSLP guidelines. However, caloric excess and the increasing prevalence of obesity among children and adolescents is of great concern, so meeting the minimum energy requirement was not relevant to the aims of this study. *trans* Fat in ruminant meat tends to be <0.5 g per serving, an amount below the criteria set by the Food and Drug Administration for reporting the presence of *trans* fat [21CFR part 101(2003)]. Given this, the total *trans* fat reported for meals with beef is likely slightly underreported.

This research was based on analysis of a local market (Houston, TX) in the summer of 2007 that included 10 of the 12 Houston-based companies offering kids meals and was not based on a simple count of meals. Most local markets consist of a variety of fast food restaurants from national and regional fast food companies. Because of this, our results (and any results at the local or regional level) will not necessarily reflect the results at the national level, and results from the national level will not necessarily reflect the results from any location. Our article introduces a method for assessing the nutrient quality of these meals and it can be applied to describe the availability of meals at the local, regional, or national levels. The method was applied at the local level because the typical consumers of this food are interested in what is available locally.

Given that Houston is a major US city, our analysis is based on a market that offered every major category of meals (eg, hamburger, chicken, deli, etc), side dishes, and beverages. This suggests that a local market will have a greater percentage of nutrient quality meals if the market is dominated with restaurants that offer kids meals that include fruit and milk and the deli sandwiches and hamburgers that reflect the nutrient composition of the ones that met all 7 guidelines. If the local market is dominated with restaurants that offer chicken-based meals with fries and sweetened beverages, our results suggest a lower percentage of nutrient-quality meals and a greater presence of meals high in added sugar, calories, and sodium.

Note that every fast food company that produced meals that met the NSLP guidelines also offered kids meals that did not meet these guidelines. Additionally, deli sandwich meals that met the NSLP included ones with cheese but did not include condiments, eg, mayonnaise, sauce, or oil, that could make significant contributions to total fat and sodium. This suggests that parents should carefully read the nutrition information to determine what is included in these meals. Sparing use of dipping sauces and other condiments will also help to keep sodium, added sugars, and fat low. Parents concerned about the nutrient quality of their children's meals might also encourage fruit as a side dish and milk instead of sweetened beverages.

The finding that 3% of the kids meals offered by fast food companies met the NSLP guidelines generates more questions than answers. Fast food companies are not required to produce meals that meet the nutrient protocol of the NSLP. Finding a small percentage of meals that met the protocol was encouraging. The findings suggest that it is possible for fast food companies to produce kids meals of acceptable nutrient quality. Some may argue that the 3% of the kids meal combinations that met the School Lunch protocol may have been due to random events. However, 42% of all kids meal combinations met 4 or more NSLP criteria. Our results suggest that fast food kids meals can be designed to be both highly palatable and meet a basic level of nutrient quality. It is the responsibility of the restaurant industry to develop and market more nutritious kids meal options and likewise for parents to choose healthy kids meals for their children. Through public policy efforts and purchasing choices, parents, physicians, consumer groups, policymakers, and public health professionals can deliver a strong, united message to fast food companies that kids meals are most desirable when they are also nutritious.

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