

Purchasing Behavior and Calorie Information at Fast-Food Chains in New York City, 2007

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We surveyed 7318 customers from 275 randomly selected restaurants of 11 fast food chains. Participants purchased a mean of 827 calories, with 34% purchasing 1000 calories or more. Unlike other chains, Subway posted calorie information at point of purchase and its patrons more often reported seeing calorie information than patrons of other chains (32% vs 4%; $P < .001$); Subway patrons who saw calorie information purchased 52 fewer calories than did other Subway patrons ($P < .01$). Fast-food chains should display calorie information prominently at point of purchase, where it can be seen and used to inform purchases. (*Am J Public Health*. 2008;98:XXXX-XXXX. doi: 10.2105/AJPH.2008.125020)

Rates of obesity and associated health complications are increasing rapidly in the United States. Fast food is typically calorie-dense, and frequent intake of fast food has been associated with increased calorie intake, weight gain, overweight, and obesity.¹⁻⁵ Despite this, fast-food restaurants are not required to provide nutritional information, and, at the time of this study, only 1 large fast-food restaurant chain in New York City (Subway) currently lists calorie information at the point of purchase. Various state and local governments, including New York City's, are considering requiring restaurants to post calorie information prominently. We conducted a large cross-sectional survey to characterize patrons' fast-food purchases and their observation and use of calorie information.

METHODS

Sampling Strategy

A roster of all licensed food service establishments is maintained by the Department of Health and Mental Hygiene. Licensed food service establishments that provided calorie information publicly as of March 1, 2007, (either posted on-site or on the Internet) were eligible for inclusion in the study. Chains that sell ice cream were excluded because the study was intended to examine calorie patterns in daily food and beverage purchases. After excluding ice cream chains, 13 chains composed almost 90% of all eligible restaurants; the sample was further limited to these chains. We randomly sampled a total of 300 chain restaurants from approximately 1625 eligible locations across the 5 boroughs of New York City. This sample included 11 fast-food chains and 2 coffee chains. Fast-food chains included Au Bon Pain, Burger King, Domino's, Kentucky Fried Chicken (KFC), McDonald's, Papa Johns, Pizza Hut, Popeye's, Subway, Taco Bell, and Wendy's. Coffee chains included Dunkin' Donuts and Starbucks. Because of different purchasing patterns at the coffee chains, our analyses are limited to the 11 fast-food chains, which accounted for 1064 (65%) of the eligible sites and 185 (62%) of the sampled sites.

Data Collection

The data collection period was from 12:00 PM to 2:00 PM on weekdays from March 27 through June 8, 2007. The target for data collection was 50 receipts per site; each location was visited once. Three-person data-collection teams stationed in front of the sampled locations maintained a count of all patrons entering the restaurant in order to calculate a participation rate. Data-collection teams approached patrons as they entered the restaurant and asked customers 18 years or older to provide their register receipts and answer a brief questionnaire when exiting; a \$2 New York City MTA Metrocard (a public transportation pass good for 1 subway or bus ride) was offered as an incentive for participation. In addition, data-collection teams asked all exiting patrons to participate. Adult patrons who agreed to participate were asked,

(1) "Was this purchase just for you?" (2) "Can you tell me what you ordered today?" (3) "What extras, modifications, or condiments did you add?" (e.g., dressing, mayonnaise, toppings; "diet" or "regular" beverage), (4) "Did you see calorie information in the restaurant?" and, if yes, (5) "Did the information affect your purchase?" The survey was conducted in English; personal identifiers were not collected.

Data Analysis

All items listed on receipts were entered into a database. Calories were ascribed to each item using each chain's Web site—published calorie information as of March 1, 2007, and adjusted based on patrons' reports of extras or customizations for which calorie information was also available. Patrons not identifying the specific type or quantity of extra were assigned that category's lowest caloric value (e.g., a patron did not specify the type of salad dressing selected, therefore 1 serving of "vinaigrette" dressing was assigned because it had the fewest calories of all dressing options). We calculated the total calories per patron by aggregating calories across items purchased. Using total calories per patron, mean calories per purchase were calculated for each chain type and for the overall sample, as was the percentage of patrons purchasing 1000 calories or more or 1250 calories or more. One thousand calories was used as a benchmark because it represents 50% of the standard-reference 2000-calorie diet; purchases were categorized in 250-calorie increments (750, 1000, 1250) to examine the overall distribution. SPSS version 15.0 Complex Samples module (SPSS Inc, Chicago, Illinois) was used for all statistical analyses. A 2-tailed t test ($\alpha < 0.05$) was used to test for differences in mean calories. For bivariate tables, the χ^2 test was used to obtain P values.

RESULTS

We excluded 18 (9.7%) of the 185 sampled sites: 7 were located in nonpublic spaces (e.g., airport, mall); 8 were closed; 2 shared names but not affiliations with sampled chains; 1 had noncooperative management; and 1 yielded

TABLE 1—Sample Distribution, Mean Calories, and Percentage of Purchases With 1000 or More and 1250 or More Calories, by Fast-Food Chain Type and for Subway: New York City, 2007

Chain type ^a	Sites, No.	Valid Receipts, No.	Calories, Mean (SE)	Calories Purchased	
				≥ 1000 Calories, %	≥ 1250 Calories, %
Burgers	75	3857	856.8 (10.8)	38.6	16.5
Chicken	14	649	931.3 (20.7)	47.5	18.0
Pizza	17	272	765.8 (115.0)	20.6	15.1
Sandwiches	49	1989	733.6 (16.2)	20.0	8.8
Tex-Mex	3	96	899.7 (60.1)	41.7	17.7
Colocated chains ^b	9	455	860.9 (24.0)	35.6	16.9
Total	167	7318	827.4 (10.7)	33.5	14.5
Subway patrons only					
All patrons	47	1830	749.2 (13.9)	21.3	9.4
Customer did not see posting ^c	...	1237	765.5** (16.6)	23.0	10.3*
Customer saw posting ^c	...	568	713.8** (15.5)	17.4	7.4*
Posting had effect on purchase ^c	...	200	646.9*** (19.4)	12.0*	4.0*
Posting had no effect on purchase ^c	...	341	745.8*** (17.0)	20.2*	9.1*

^aChain type definitions: Burger = Burger King, McDonald's, Wendy's; Chicken = Kentucky Fried Chicken (KFC), Popeye's; Pizza = Domino's, Papa John's, Pizza Hut; Sandwiches = Au Bon Pain, Subway; Tex-Mex = Taco Bell; Colocated = KFC/Taco Bell, Pizza Hut/Taco Bell, KFC/Pizza Hut, Burger King/Popeye's.

^bColocated chains refer to store locations with 2 or more chains sharing a retail space; receipts from these locations could include items from either or both chains.

^cSelf-reported.

* $P < .05$; ** $P < .01$; *** $P < .001$.

no valid receipts. From the remaining 167 sites, 7750 receipts and surveys were collected, of which 432 (5.6%) were excluded because the purchase was for someone other than the patron, the receipt was from a non-sampled fast-food chain, or the receipt listed 1 or more item with an undetermined caloric value. Because of logistical challenges, restaurant outlets with a high volume of customer traffic (>150 patrons during the survey period) had lower rates of survey participation (33.3%) than did lower-volume sites (60.2%); overall participation was 55.2%.

Patrons purchased a mean of 827 calories, with 34% purchasing 1000 calories or more, and 15% purchasing 1250 calories or more (Table 1). Chicken chain patrons purchased the most calories, and sandwich chain patrons purchased the fewest calories.

Reported Observation of Calorie Information

Ninety-eight percent (7152 of 7318) of respondents answered the survey question

assessing observation of calorie information. Excluding Subway patrons, only 4% of patrons reported seeing calorie information as currently provided. Subway patrons were much more likely to report seeing calorie information than were patrons of other chains (32% vs 4%; $P < .001$).

Among Subway patrons, those who reported seeing calorie information purchased 52 fewer calories than those reporting not seeing calorie information (mean calories: 714 vs 766; $P < .01$), and fewer purchased higher-calorie meals (17% vs 23% purchased ≥ 1000 calories; $P < .01$; and 7% vs 10% purchased ≥ 1250 calories; $P < .05$). Of Subway patrons who reported seeing calorie information, 37% reported that this information had an effect on their purchases. Those who reported seeing and using calorie information purchased 99 fewer calories than those who reported seeing the information and that it had no effect (mean calories: 647 vs 746; $P < .001$). These patrons were also less likely to purchase 1250 or more calories

(4% v. 9%; $P < .03$; Table 1). There was no significant difference in mean calories purchased by patrons reporting seeing but not using calorie information and patrons who reported not seeing calorie information (mean calories: 746 vs 766; $P = .29$).

DISCUSSION

Despite its public availability, the number of food service establishment patrons (excluding Subway patrons) who reported seeing calorie information was very low. This finding is consistent with previous studies.^{6,7} In comparison, Subway's placement of limited calorie information on deli cases near the registers, although not prominent, was associated with a much higher proportion of patrons seeing calorie information. Furthermore, over one third of these Subway patrons reported that this information affected their purchase. Objective measurement of calorie content through examination of receipts confirmed that patrons who reported seeing and using calorie information purchased fewer calories than did those reporting that they did not see or use calorie information.

The importance of providing calorie information is supported by the finding that patrons purchased foods with high-energy contents: one third of patrons purchased more than 1000 calories for a single meal. Caloric intake is rising in the United States in parallel with the obesity epidemic: between 1971 and 2000, Americans' average daily caloric intake increased approximately 200 to 300 calories.^{1,8,9} Fast food, which represents approximately 74% of all restaurant traffic nationally (marketing research data; The NPD Group/CREST, written communication, October 2007), typically contains more calories per serving than does food prepared at home.^{1,2,4}

New York City and several other jurisdictions have considered requiring certain restaurants to post calorie information on their menus and menu boards.¹⁰ In this study, which was limited to chains that made calorie information publicly available, few patrons (less than 5%) saw calorie information when it was provided only in less-prominent formats, such as charts on counter mats,

distant walls or posters, or on a Web site. The percentage was higher (32%) at Subway, which displayed information near the point of purchase. This suggests that displaying calorie information even more prominently, such as on menu boards, might increase the proportion of patrons seeing—and using—calorie information.

Our findings regarding the association of caloric content of purchases with observation of calorie information are subject to at least 3 limitations. First, Subway patrons might not be representative of all chain restaurant patrons: Subway patrons purchased fewer calories than did other chains' patrons. This could indicate that food available at Subway was lower in calories or that Subway patrons were more likely to purchase food with fewer calories than other chains' patrons. However, even when the analysis was restricted solely to Subway patrons, those seeing calorie information purchased fewer calories. Furthermore, Subway is the largest noncoffee fast food chain in New York City, and its popularity suggests broad appeal; it is likely that if other chains were to make calorie information visible at point of purchase, patrons at these chains would be interested in and use calorie information to make healthier choices.

Second, it is possible that Subway patrons who reported seeing calorie information did so because they were more concerned about weight than were Subway patrons who reported not seeing calorie information. However, patrons who reported seeing but not using calorie information and patrons who reported not seeing calorie information purchased similar calories, indicating comparable purchasing patterns.

Third, study respondents may have differed from patrons choosing not to participate. However, data were collected over the busy lunch period, and the proportion of participants providing receipts varied primarily by consumer traffic volume, suggesting that individual patron factors were not major determinants of participation rates. Overall, this report's findings suggest that when fast-food chain patrons are provided calorie information prominently prior to purchase, many will see it and use it to reduce their caloric intake.

Given the frequency of fast food consumption, even modest reductions in calories (e.g., 50 calories per meal) could significantly reduce population-level caloric intake.^{11,12} However, the vast majority of patrons purchasing fast food do not have ready access to the information needed to make healthy decisions. In December 2006, the New York City Board of Health mandated posting calorie information on restaurant menus and menu boards. This mandate was legally challenged and overturned in September 2007. In January 2008, the New York City Board of Health approved a new mandate addressing the concerns raised by the legal ruling, to which there was again a challenge. The challenge was rejected by the courts, and an appeal has been made to a higher court. Public health authorities and restaurant establishments should consider interventions to make calorie information more prominently visible at point of purchase to increase information, reduce calorie intake, and reduce obesity-related morbidity and mortality.

The per-meal caloric content of fast-food purchases is high. Although fast-food restaurants report publishing nutritional information publicly, most chains' current methods of providing this information to patrons are ineffective. Placement of calorie information at point of purchase is more effective and may be associated with lower calorie purchases among consumers reporting seeing information. ■

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Contributors

M. T. Bassett, T. Dumanovsky, L. D. Silver, C. Young, T. D. Matte, and T. R. Frieden were responsible for study concept and design. C. Huang supervised data collection, and analyzed and interpreted the data along with M. T. Bassett, T. Dumanovsky, S. Chideya, and T. R. Frieden. M. T. Bassett, T. Dumanovsky, and S. Chideya drafted the article. M. T. Bassett, L. D. Silver,

C. Nonas, and T. R. Frieden were responsible for reviewing the article for intellectual content. T. D. Matte provided statistical expertise. T. Dumanovsky and T. D. Matte supervised the study.

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Human Participant Protection

The study protocol was determined to be exempt by the institutional review board for the Department of Health and Mental Hygiene.

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