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Calorie Changes in Large Chain Restaurants:

Declines in New Menu Items but Room for Improvement

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Abstract

Introduction—Large chain restaurants reduced the number of calories in newly introduced menu items in 2013 by about 60 calories (or 12%) relative to 2012. This paper describes trends in calories available in large U.S. chain restaurants to understand whether previously documented patterns persist.

Methods—Data (a census of items for included restaurants) were obtained from the MenuStat project. This analysis included 66 of the 100 largest U.S. restaurants that are available in all three 3 of the data (2012–2014; N=23,066 items). Generalized linear models were used to examine: (1) per-item calorie changes from 2012 to 2014 among items on the menu in all years; and (2) mean calories in new items in 2013 and 2014 compared with items on the menu in 2012 only. Data were analyzed in 2014.

Results—Overall, calories in newly introduced menu items declined by 71 (or 15%) from 2012 to 2013 ($p=0.001$) and by 69 (or 14%) from 2012 to 2014 ($p=0.03$). These declines were concentrated mainly in new main course items (85 fewer calories in 2013 and 55 fewer calories in 2014; $p=0.01$). Although average calories in newly introduced menu items are declining, they are higher than items common to the menu in all 3 years. No differences in mean calories among items on menus in 2012, 2013, or 2014 were found.

Conclusions—The previously observed declines in newly introduced menu items among large restaurant chains have been maintained, which suggests the beginning of a trend toward reducing calories.

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Introduction

Our recent study evaluating calorie changes in large chain restaurants¹ found that the number of calories in newly introduced menu items in 2013 decreased by about 60 calories (or 12%) relative to 2012, possibly in anticipation of the final rule about menu labeling from the U.S. Food and Drug Administration required by the 2010 Affordable Care Act. That rule mandates that calorie information be posted on menus and menu boards.²

Since the 1970s, the consumption of food eaten away from home has increased and now accounts for almost half of Americans' total food-related spending.³⁻⁵ This increase in food away from home parallels temporal increases in obesity. Restaurant food may encourage overconsumption and increase the risk of obesity owing to large portion sizes (portion sizes of out-of-home meals are relatively large compared with home-prepared foods⁶) and high calories.^{7,8} In particular, foods purchased from food outlets are 65% more energy dense than the average diet.⁷ For example, the number of calories in a large size cheeseburger meal (which includes French fries and regular cola) represents 65%–80% of a 2,000-calorie/day diet.⁹ Generally, eating away from home more frequently is associated with obesity, higher body fat, and higher body weight, even after controlling for a range of sociodemographic variables, including income.¹⁰⁻¹⁴ The public's exposure to restaurants is high, with 990,000 restaurant locations in the U.S.¹⁵

Should the recently observed downward trend in calories of newly introduced menu items in chain restaurants¹ persist (or increase in response to growing consumer demand for low-calorie options once the calories are posted), it could have a sizable impact on population obesity and help to prevent future obesity. In particular, reducing the caloric content of menu items in chain restaurants and other covered food outlets by approximately 60 calories may help to substantively reduce the daily number of excess calories underlying the obesity epidemic in adults (220 calories/day)¹⁶ and children (165 calories/day).¹⁷

Understanding restaurant changes in calories is particularly important because they do not rely on the customer to first notice and then be influenced by the menu label to make a healthy choice. It may be unrealistic to expect large changes in consumer purchases in response to menu labeling because relatively few restaurant customers notice menu labels (approximately 30%)^{18,19} and individual behaviors prove resistant to change.²⁰ Yet, virtually all research to date evaluating local menu labeling efforts has focused on individual changes and the evidence as to the degree to which they influence food choices is mixed.^{18,19,21-30} The bigger impacts of menu labeling may be seen through its effects on restaurant industry's reformulation of products to have fewer calories. In fact, in anticipation of these regulations, many large restaurants have already implemented what they describe as self-regulatory actions to increase the transparency of nutritional information (e.g., McDonalds began voluntary menu labeling in 2012).^{31,32}

The objective of this study is to describe trends in calories available in large U.S. chain restaurants¹ to better understand restaurant-driven changes in calories, regardless of whether the change was prompted by the labeling act or by other societal forces. Specifically, an additional year of data was added to understand whether previously documented trends in

mean calories persisted over time and whether the difference in mean calories of newly introduced items in 2013 and 2014 was different than those items on the menu in 2012 only. Our ability to use 3 years of data is an important contribution to knowledge about the U.S. restaurant environment because other studies examining the calorie content of chain restaurants include 1, or at most, 2 years of data.^{33–35} Building on this earlier research, the study hypothesis is that mean per-item calories will remain the same for items commonly on the menu year over year, and that mean per-item calories will continue to decline for newly introduced menu items.

Methods

Data

Data from the MenuStat project (menustat.org/) was used, which includes information about menu items in a majority of the 100 largest U.S. restaurant chains. Detailed methods are described elsewhere.³⁶ Briefly, the data include caloric information about menu items made public by restaurants on their websites. Each item is categorized into one of 12 mutually exclusive menu categories. We restricted the data to 66 of the 100 largest U.S. restaurants that are available in all 3 years of the data (2012–2014).

The data represent a census of menu items over 3 years in 66 large chain restaurants (N=23,066), meaning that any patterns observed in menu item calories from 2012 to 2014 are true in these restaurants. However, to make inferences on the national level, the data were considered a non-probability sample of menu items from other large, U.S.-based chain restaurants.

Measures

Two continuous outcomes were examined: (1) the mean within-item change in calories from 2012 to 2014 among items on the menu in all 3 years; and (2) the difference in mean per-item calories, comparing menu items newly introduced in 2013 and 2014 with those items on the menu in 2012 only. Menu items offered in all 3 years were defined as those items with the same item name and description within a given restaurant and menu category. New menu items in 2013 were defined as those that had no item name, description, or calories recorded in 2012, but did have an item name, description, and calories recorded in 2013. Similarly, new menu items in 2014 were defined as those that had no item name, description, or calories recorded in 2012 or 2013, but did have an item name, description, and calories recorded in 2014.

For the first outcome (within-item calorie changes), the main independent variable was a year indicator. For the second outcome (difference in calories between newly introduced items versus old items), the main independent variable was an indicator of whether a menu item was on the menu only in 2012, newly introduced in 2013, or newly introduced in 2014.

Several covariates were included to classify menu items in terms of children's menu item status, whether an item was offered regionally or for a limited time only, and whether an item was an appetizer, main course, dessert, or topping/ingredient. At the restaurant level, covariates were defined to indicate whether a restaurant was national or not (based on

having locations in each of the nine U.S. Census Divisions), and restaurant types (fast food, full service, or fast casual). Restaurant indicator variables were considered as covariates but did not affect results and therefore were not included in the models reported here.

Descriptions of covariate definition methods are included in the Appendix, and descriptive statistics of restaurant-level data are shown in the Appendix, Table A1.

Statistical Analysis

Two sets of trend analyses were conducted using generalized linear models to examine: (1) per-item calorie changes from 2012 to 2014 among items on the menu in all years; and (2) mean calories in new items in 2013 and 2014 compared with items on the menu in 2012 only. For these comparisons, *p*-values are presented as the census data are also conceived as a sample generalizable to large chain restaurants. All analyses controlled for the aforementioned covariates, and SEs were adjusted to account for clustering at the restaurant level. Significance was considered at $p < 0.05$. Data were analyzed in 2014.

Results

Table 1 shows characteristics of menu items included in the present study; each column represents menu characteristics. Of the 23,066 items offered on menus in 2012–2014, 45% were offered in all 3 years, 20% were newly introduced in 2013, 16% were newly introduced in 2014, and 13% of items newly offered in 2013 remained on the menu in 2014. The majority of items (68%) were in national restaurants, and half of all menu items (55%) were in fast food restaurants. Some menu item characteristics varied by menu category; for instance, 62% of items classified as appetizers and sides were offered in all 3 years, compared with 59% of dessert items and 43% of main course items. Nearly 17% of main course items were new in 2013 and 15% were newly offered in 2014.

Consistent with our previous work examining trends in 2012 and 2013,¹ there were no statistically significant or meaningful changes in predicted mean calories among items on menus in all 3 years (Table 2). These results were similar overall and by menu category. In a separate analysis (not shown but available upon request), we also examined mean calories on the menu overall (without distinguishing among constant, new, or dropped menu items) and did not see significant differences over time ($p = 0.39$ for trend).

Figure 1 compares calorie differences among items offered in all 3 years and new menu items introduced in a given year. Common menu items are those that were available across all 3 years and new items are those that were newly introduced in that year. For each year, mean calories among newly introduced items were higher than mean calories among menu items commonly on the menu (2012, 345 [95% CI=307, 382] kcal vs 470 [95% CI=391, 549] kcal; 2013, 345 [95% CI=306, 381] kcal vs 399 [95% CI=332, 466] kcal; 2014, 349 [95% CI=311, 386] kcal vs 401 [95% CI=341, 460] kcal).

Table 3 shows mean calories on the menu in 2012 only versus newly introduced menu items in 2013 or 2014. Menu items newly introduced in 2013 and 2014 had substantially fewer calories relative to items only on the menu in 2012 (2012 vs 2013, -71 kcal, $p = 0.001$; 2012 vs 2014, -69 kcal, $p = 0.03$).

Comparing menu items only on the menu in 2012 with those new in 2013, new food items, beverages, coffee beverages, and children's menu items all had fewer mean calories relative to old menu items (66, 47, 43, and 35 fewer calories, respectively). Predicted mean per-item calories in new main course items in 2013 had 85 fewer calories relative to old main course items in 2012 ($p=0.01$). Among main course items, calories declined in several categories: pizza (120 fewer calories, $p=0.04$), sandwiches (82 fewer calories, $p<0.001$), and salads (68 fewer calories, $p=0.20$).

Comparing menu items only on the menu in 2012 with those new in 2014, new food items, beverages, coffee beverages, and children's menu items all had fewer mean calories relative to old menu items (60, 50, 12, and 38 fewer calories, respectively). Predicted mean per-item calories in new main course items in 2013 had 55 fewer calories relative to old main course items in 2012 ($p=0.16$). Among main course items, calories declined among pizza (201 fewer calories, $p=0.18$), sandwiches (136 fewer calories, $p<0.001$), and burgers (17 fewer calories, $p=0.86$).

Mean calories for menu items new in 2013 and also offered in 2014 were 358 (95% CI=288, 428) calories compared with 421 (95% CI=311, 531) calories for items new in 2013 that did not remain on the menu in 2014 (66 fewer calories, $p=0.15$).

Discussion

This study finds that previously observed declines in newly introduced menu items among large restaurant chains in the U.S.¹ have been maintained, which suggests the beginning of a trend toward reducing calories. Overall, calories in newly introduced menu items declined by 71 (or 15%) from 2012 to 2013 and by 69 (or 15%) from 2012 to 2014. This finding is contextualized by the fact that although average calories in newly introduced menu items are declining, they are higher than items common to the menu in all 3 years. As a result, the observed changes in calories will have the largest impact on consumers who frequently purchase new menu items in chain restaurants. No differences in mean calories among items on menus in 2012, 2013, and 2014 were found. It is important to note that these observed declines in newly introduced menu items are capturing voluntary actions by large chain restaurants, as the federal menu labeling regulation for restaurants will not take effect until December 1, 2015.

Although calories in the nation's largest chain restaurants are declining through the introduction of new, lower-calorie menu items, the present results find that new items generally have more calories than items commonly on the menu. Specifically, compared with items commonly on the menu, newly introduced items had an average of 125 more calories in 2012, 55 more calories in 2013, and 52 more calories in 2014. This could be because higher-calorie, palatable ingredients are used to entice consumers to new items. Burger King, for example, has been able to attract customers and boost sales by introducing specialty items that are ever more extravagant.³⁷ In April 2014, they introduced the Chicken Big King sandwich, which includes two fried chicken patties, melted cheese, and an additional bun between the patties. By contrast, Burger King's signature sandwich—the Whopper, originally introduced in 1957—has one beef patty and no cheese.

It should be noted that the Menustat data do not include information about purchases. However, restaurants presumably maintain new items on the menu that sell, and remove those which do not. Mean calories among menu items only offered in 2013 were higher than those that were new in 2013 and also offered in 2014, suggesting that consumer demand may be higher for newly introduced items that are lower in calories.

Although other studies have examined the calorie content of chain restaurants, those studies include 1, or at most, 2 years of data.^{33–35} These results are similar to prior estimates showing declines in calorie content,^{35, 38} and contrast with prior work showing no change in mean calories in entrees (although mean energy in children's menu entrees decreased by 40 calories).³³

A key advantage of this analysis is the use of 3 years of data, which allows for the examination of relatively longer-term trends. In particular, the multiple years of Menustat data put recently observed declines in newly introduced calories¹ into perspective. The average calories in new menu items in 2013 and 2014 are in fact lower than those only on the menu in 2014, but they are not lower than menu items common across all years.

One factor that may motivate chain restaurants to continue reducing the calories in their newly introduced menu items or even begin to reduce the calories in their common menu items is consumer preferences. Increasingly, Americans are demanding healthier food. The number of farmers markets has tripled, from 2,800 in 2000 to 8,300 in 2014.³⁹ Organic/natural food sales, which totaled \$81 billion in 2012, are expected to increase until 2018 with an annual growth rate of 14%.⁴⁰ Consumer demand for lower-calorie items in chain restaurants may also be motivated by the small but influential group of consumers⁴¹ who report noticing calorie information on menu boards in chain restaurants.⁴²

Limitations

Our findings should be interpreted in light of several limitations. The data are limited to menu items in the largest U.S. chain restaurants, so these results are unlikely to be generalizable to small chains, locally owned restaurants, or fine dining restaurants. The coding of caloric information may have been subject to human error, as calories were transcribed from restaurants' websites. However, the caloric content published by restaurants has high accuracy.³⁶ It is unknown whether restaurant changes in menu items calories will reduce caloric intake and, subsequently, obesity. Although our ability to use census data is a strength, the Menustat data are a non-probability sample, which limits inferences to large chains included in this analysis. Finally, these data describe menu items available for purchase, not sales. Therefore, the frequency with which lower-calorie items were purchased or the characteristics of customers who typically made that choice is unknown.

Conclusions

This study uses national-level data from 2012 to 2014 to describe trends in the caloric content of menu items in large chain restaurants in the U.S. Chain restaurants are ubiquitous and represent a significant source of calories for many Americans.⁴ The observed changes in this analysis—coupled with the considerably expanded final rule about menu labeling,

which includes a wide variety of food outlets with more than 20—locations may be a powerful tool for helping consumers reduce their calorie intake, and subsequently reduce population obesity.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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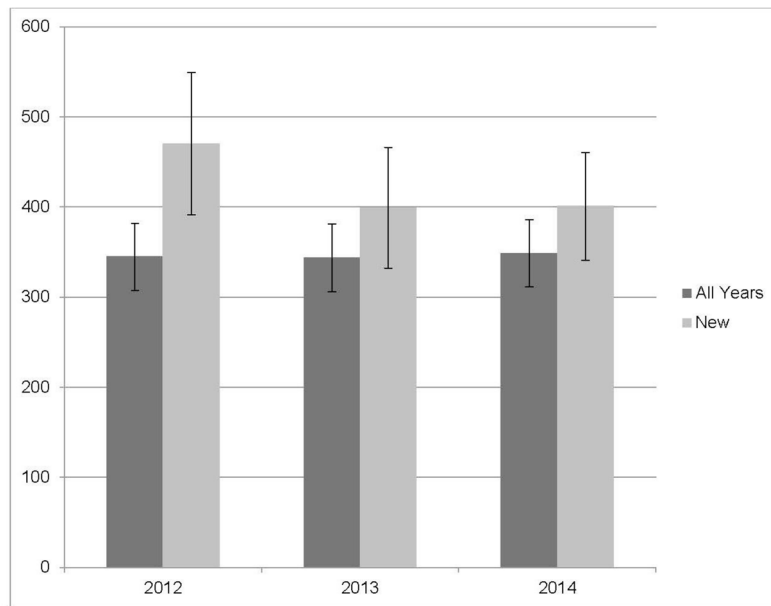


Figure 1. Mean calories among items on the menu 2012–2014 versus items newly introduced in each year.

Notes: Predicted mean per-item calories in each year are adjusted for children’s menu item status, whether a restaurant chain is national, and restaurant type (fast food, full service, fast casual). SEs are clustered to account for correlation within restaurants.

Table 1
Menu Item Characteristics in 66 U.S. Restaurants in 2012–2014, Overall and Stratified by Menu Category

Menu category	n	% all menu items	% items offered all years	% items new in 2013	% items new in 2014	% new in 2013 and offered in 2014	% items in national restaurants ^d	% items offered regionally or for a limited time	% children's menu items ^b	% items in fast-food restaurants ^c
Overall N	-	23,066	10,295	4,530	3,760	3,064	15,646	1,481	1,616	12,754
Overall	23,066	100.0	44.6	19.6	16.3	13.3	67.8	6.4	7.0	55.3
Food ^d	12,042	52.2	48.1	15.3	14.2	9.3	63.1	7.5	6.2	50.1
Beverages	7,354	31.9	35.9	28.7	21.1	20.1	77.5	6.4	7.9	63.8
Coffee only	2,740	11.9	21.1	51.3	18.0	34.7	100.0	2.9	2.2	39.1
Children's menu	1,616	7.0	54.5	18.4	11.5	15.5	58.7	3.5	100.0	43.0
Menu category										
Appetizers and sides	1,460	6.3	61.8	9.8	13.6	6.2	57.3	6.4	14.2	38.5
Main courses ^e	8,326	36.1	42.9	16.6	14.6	10.2	63.3	7.0	5.5	47.7
Pizza	891	3.9	53.1	12.5	11.5	9.4	74.0	7.5	2.1	44.1
Sandwich	2,660	11.5	32.6	19.7	14.6	10.2	68.8	8.4	3.5	78.4
Burgers	665	2.9	55.9	12.5	11.9	6.2	42.9	9.6	7.8	73.5
Entrees	2,915	12.6	44.8	14.2	16.5	9.1	61.2	5.3	8.9	19.5
Salads	724	3.1	44.5	18.5	18.1	14.4	62.7	3.0	2.4	33.2
Soups	471	2.0	48.3	25.5	7.0	18.1	55.8	11.7	2.6	41.4
Desserts ^f	2,256	9.8	58.7	14.1	13.2	8.2	66.2	10.0	3.4	66.4
Toppings/Ingredients	3,670	15.9	50.7	15.6	13.5	12.5	63.9	2.9	7.9	55.4

^aNational restaurants defined as restaurants with locations all 9 U.S. Census Divisions.

^bChildren's menu items defined as the words "kids", "kid", "child", or "children" appearing the menu item or menu item description.

^cFast-food restaurants defined as those without table service and that did not meet criteria for fast casual restaurants. 28.0% of items were on menus in full service restaurants and 16.9% of items were on menus in fast casual restaurants.

^dIncludes all menu categories except beverages and toppings/ingredients.

^eIncludes burgers, entrees, pizza, sandwiches, and salads and soups that are not categorized as appetizers or side dishes.

^fIncludes desserts and other baked goods.

Table 2

Predicted Mean Per-Item Calories Among Items on Menus in 2012, 2013, and 2014, Overall and Stratified by Menu Category

Menu category	n	Mean calories, 2012	Mean calories, 2013	Mean calories, 2014	p-value for trend
Overall					
Food ^a	5,795	457.8	456.1	465.9	0.29
Beverages	2,640	258.5	259.3	258.5	0.98
Coffee only	579	263.2	263.7	261.9	0.13
Children's menu	880	222.7	221.8	223.4	0.81
Menu category					
Appetizers and sides	902	346.3	345.8	354.5	0.16
Main courses ^b	3,368	507.2	505.3	518.6	0.27
Pizzas	473	357.1	356.3	355.9	0.45
Sandwiches	868	522.0	518.7	520.7	0.71
Burgers	372	628.7	626.1	643.0	0.31
Entrees	1306	565.7	563.5	592.5	0.30
Salads	322	482.7	484.7	483.0	0.95
Soups	227	262.2	261.5	270.9	0.28
Desserts ^c	1325	400.6	398.6	399.7	0.74
Toppings/Ingredients	1,861	114.7	114.2	112.7	0.16

^a Includes all menu categories except beverages and toppings/ingredients.

^b Includes burgers, entrees, pizza, sandwiches, and salads and soups that are not categorized as appetizers or side dishes.

^c Includes desserts and other baked goods.

Notes: Mean per-item calories in each year adjusted for children's menu item status, whether a restaurant chain is national, and restaurant type (fast food, full service, fast casual). SEs are clustered to account for correlation within restaurants.

Table 3
 Mean Calories on the Menu Only in 2012 Versus Newly Introduced Items in 2013 and 2014

Menu category	n	Mean calories, 2012 items	Mean calories, new in 2013	Mean calories, new in 2014	Difference in calories 2012-2013	p-value	Difference in calories 2012-2014	p-value
Overall								
Food ^a	5,160	612.8	546.8	552.6	-65.9	0.04	-60.1	0.10
Beverages	4,085	357.6	328.5	325.9	-47.1	0.23	-49.8	0.29
Coffee only	2,037	310.7	267.7	298.5	-43.0	0.02	-12.2	0.69
Children's menu	589	235.1	200.6	197.2	-34.5	0.50	-37.9	0.49
Menu category								
Appetizers and sides	453	336.7	384.1	361.7	47.5	0.25	25.1	0.61
Main course ^b	3,946	653.3	568.5	598.3	-84.8	0.01	-55.0	0.16
Pizzas	279	536.4	416.2	335.6	-120.2	0.04	-200.8	0.18
Sandwiches	1,521	699.4	617.8	563.4	-81.6	<0.001	-135.9	<0.001
Burgers	253	796.3	823.5	779.1	27.2	0.68	-17.2	0.86
Entrees	1,331	658.4	650.4	684.8	-8.0	0.88	26.3	0.64
Salads	352	486.3	418.4	545.2	-67.9	0.20	59.8	0.28
Soups	210	226.9	250.1	258.8	23.2	0.31	31.9	0.39
Desserts ^c	761	481.5	517.9	486.9	36.4	0.34	5.3	0.89
Toppings/Ingredients	1,514	105.6	133.6	112.7	27.9	0.22	7.0	0.69

^aIncludes all menu categories except beverages and toppings/ingredients.

^bIncludes burgers, entrees, pizza, sandwiches, and salads and soups that are not categorized as appetizers or side dishes.

^cIncludes desserts and other baked goods.

Notes: Mean per-item calories in each year adjusted for children's menu item status, whether a restaurant chain is national, and restaurant type (fast food, full service, fast casual). SEs are clustered to account for correlation within restaurants.