# Calorie Changes in Large Chain Restaurants

## Declines in New Menu Items but Room for Improvement

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**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 of the data years (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 restaurants[1] 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 foods[6]) 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

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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 restaurants[1] 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 restaurants[1] 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 nonprobability 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 (available online),[37,38] and descriptive statistics of restaurant-level data are shown in the Appendix Table 1 (available online).

## Statistical Analysis

Two sets of trend analyses were conducted using generalized linear models to examine: (1) per-item calorie changes from 2012 to 2014