

## Healthfulness of Fast-Food and Full-Service Restaurants in 16 Georgia Counties after Mandatory Menu Labeling

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### ABSTRACT

**Background:** Despite that the effect of menu labeling on consumer choices has been studied, there are gaps in the research on the healthfulness of the restaurant food environment post-mandatory menu labeling, specifically in the Southern United States. This study aims to assess the healthfulness of fast-food and full-service chain restaurant environments after compliance with mandatory menu labeling.

**Methods:** The healthfulness of 46 representative fast-food and full-service chain restaurants in 16 Georgia counties was examined using the Nutritional Environment Measures in Restaurants (NEMS-R) survey. The scores were compared between full-service and fast-food restaurants using t-tests across several healthfulness measures such as facilitators and barriers to healthful eating.

**Results:** Fast-food restaurants had more barriers to healthy eating than full-service restaurants. Specifically, fast-food restaurants, compared to full-service restaurants were more likely to encourage large portions (60.9% vs. 17.4%,  $p=0.006$ ) and offer combination meals at a cheaper price than the sum price of individual items (56.5% vs. 21.7%,  $p=0.033$ ).

**Conclusions:** Findings on the post-menu labeling chain restaurant food environment in our study does not show improvements from the extant evidence on pre menu labeling food environment. Further, NEMS-R scores for both fast-food and full-service restaurants indicated the need for improvements in the healthfulness of chain fast-food and full-service restaurants' food environments.

**Keywords:** Food environment, healthfulness, mandatory menu labeling

### INTRODUCTION

In the United States (US), obesity is a serious public health problem (Hales et al., 2020). Age-adjusted prevalence of obesity among US adults was 42.4% in 2017-2018 (Hales et al., 2020). Obesity prevalence is often linked to the local food environment and dining out. Food away from home accounts for 50.2% of US households' food budgets and total spending has grown steadily in the last three decades (Michelle et al., 2018). Types of food stores and restaurants influence food choices, and subsequently diet-related health outcomes (Gordon-Larsen, 2014; Morland & Evenson, 2009). Specifically, the prevalence of fast-food restaurants has been identified as a potential contributor to higher obesity prevalence. Eating at fast-food restaurants is positively associated with a high-fat diet and high Body Mass Index (BMI) and is negatively associated with vegetable consumption and physical activity (Jeffery et al., 2006). Furthermore, adults residing in cities with a large share of full-service restaurant workers are less likely to be obese, while adults living in cities with a large share of fast-food restaurant workers are more likely to be obese (Michimi & Wimberly, 2015).

Menu labeling with calories, originally implemented in the Patient Protection and Affordable Care Act (ACA) in 2014, has been proposed as a policy approach to address the obesity epidemic by helping people estimate the number of calories in prepared foods that they order at restaurants (Sandra et al., 2010). The implementation of menu labeling is designed for consumers to become aware of the nutritional composition of the food they are consuming and encourage restaurants to reduce the number of calories in their food as a result of calorie information (Kiszko et al., 2014). The effect of menu labeling on consumer choices has been studied, however, how the restaurant food environment after the implementation of menu labeling compares to that of prior menu labeling is less known (Bleich et al., 2017). There are research gaps on whether or not the healthfulness of restaurant meals has changed after the 2014 mandatory menu labeling under ACA, despite growing scientific evidence supporting policies that intervene on environmental determinants of overeating (Novak & Brownell, 2012). Additionally, there are still gaps in the literature examining how policies might affect the healthfulness of food in the food environment, and how these policies influence specific types of food environments

differently. More specifically, little is known about the healthfulness of foods available in different kinds of restaurants after the 2014 federal menu labeling mandate requiring restaurants with more than 20 locations to post caloric information on their menus. The Federal Registrar's rule on "Food Labeling; Nutrition Labeling of Standard Menu Items in Restaurants and Similar Retail Food Establishments" is available in the link <https://www.federalregister.gov/documents/2014/12/01/2014-27833/food-labeling-nutrition-labeling-of-standard-menu-items-in-restaurants-and-similar-retail-food>.

Previous studies have used the Nutritional Environment Measures in Restaurants (NEMS-R) to compare the healthfulness of restaurant menus before the 2014 federal mandate. The NEMS-R was originally developed and tested in 2007. In its original implementation in 2007, fast-food restaurants had a greater healthy entrée and main-dish salads availability, but sit-down restaurants had a higher proportion of healthy main-dish salads and more healthy food options (B. E. Saelens, Glanz, Sallis, & Frank, 2007). Additionally, fast-food restaurants more often encouraged large portions, unhealthy eating, and overeating, and offered relative cost savings for combination meals (B. E. Saelens et al., 2007). In 2012, NEMS-R was used to assess the healthfulness of food available at quick-chain restaurants in King County, Washington pre-and post- countywide nutrition labeling regulation. The study found a significant increase in nutrition label use, significantly less reinforcement to overeat, significantly fewer barriers to healthy eating, and significant improvements in healthfulness on the kids' menu within the period when King County restaurants posted nutrition-labeling regulations. There were also fewer large portions and less reinforcement to overeat in the quick chain restaurants six and 18 months post-regulation enforcement (B. E. Saelens et al., 2012). In 2014, the NEMS-R survey was used to compare menus of fast-food restaurants and bodegas in the New York City area. Fast-food restaurants were more likely to provide nutritional information, while bodegas scored higher on healthy food availability, promotions, and pricing. Healthfulness scores were also higher in low-poverty neighborhoods than in high-poverty neighborhoods (Neckerman et al., 2014). Thus, we are confident in the validity of the NEMS-R survey in predicting the healthfulness of menus in chain fast-food and full-service restaurants.

The objective of this study is to use the NEMS-R, the 2014 federal menu-labeling mandate, and the 2018 compliance date, to assess the current healthfulness of menus in chain restaurants and compare the healthfulness scores between fast-food restaurants and full-service restaurants in 46 randomly selected chain restaurants located in 16 Georgia counties.

## **METHODS**

### **Selection of Georgia Counties, Identification, and Clarification of Restaurants**

The 16 most populated Georgia counties were used in this study due to their anticipated diversity of chain restaurants and their high percentage of obesity prevalence. Georgia counties were classified in the top 16 most populated counties if their population was greater than 100,000 per county. The counties included Fulton, Gwinnett, DeKalb, Cobb, Chatham, Clayton, Henry, Cherokee, Henry, Richmond, Muscogee, Forsyth, Bibb, Houston, Paulding, and Columbia. Chain restaurants, defined as restaurants having 20 or more locations, in these counties were identified using online county restaurant inspection scores from the State Department of Public Health website on restaurant environment inspection reports (Georgia Department of Public Health) and Google maps. The selection of the 16 most populated counties allowed representation of all chain restaurants. Restaurants were classified as either fast-food or full-service according to the American Industry Classification System (American Industry Classification System). Fast-Food restaurants were defined as having limited service wherein patrons order and pay before eating. Full-service restaurants were defined as those engaged in providing food services to patrons who order and are served while seated (i.e., waiter/waitress service) and pay after eating. Ultimately, a random sample of 46 chain restaurants- 23 fast-food and 23 full-service restaurants was selected using a random number generator from a list of 118 chain restaurants that were present in all the 16 selected counties. The 23 fast-food and 23 full-service restaurants were evaluated using the NEMS-R survey instrument.

### **NEMS-R Protocol and Procedure**

The NEMS-R survey was used in this study to measure and compare the nutrition environment in 23 fast-food and 23 full-service restaurants (B. E. Saelens et al., 2007). The original and validated version of the NEMS-R Scoring System can be accessed on the following website: <http://nems-upenn.org/wp-content/uploads/2018/10/NEMS-R-Scoring-System-Dimensions-03-29-11.pdf>. The survey measures healthy food availability, facilitators of healthy eating, and barriers to healthy eating, as well as nutrition information, advertising, and pricing that promotes healthy or unhealthy eating habits (Saelens et al., 2007). The typical NEMS-R protocol was modified because we evaluated the restaurants using their online menu instead of conducting a site visit, as a result, four measures requiring site visits were removed. All of our data to develop scores came from online menus.

Inter-rater reliability was established by all the involved coders (three graduate research assistants-NK, DA, MA) initially evaluating the same two restaurants and comparing the variations in the scoring they encountered independently. There were no variations across the three coders. The study was conducted in the spring of 2019.

## Statistical Analysis

Coders recorded healthfulness measures from the NEMS-R survey questions using a dichotomous scale. Coders then took these 43 total measured outcomes from NEMS-R survey questions and assigned point values to the outcomes. Total NEMS-R scores were calculated using a scoring sheet that added up total NEMS-R point values. Total scores had a range from -7 to 28 with higher scores indicating healthier food environments. Sub-scores representing aspects of the food environment, including the availability of healthful options, facilitators of healthy eating, and barriers to healthy eating, were also calculated. Ranges for these scores were 0 to 15 for the availability of healthful options, 0 to 4 for facilitators of healthy eating, and -4 to 0 for barriers to healthful eating. The measures requiring site visits were not included in our total scores. These measures were: information posted, highlighting healthy options, healthy eating encouraged, unhealthy eating encouraged, overeating encouraged, and access to a salad bar. Internet nutrition availability and internet identification of healthy menu options were also not included. Comparisons between fast-food restaurants and full-service restaurants were made using Fisher's Exact Test for dichotomous variables and t-tests for continuous variables. We did not use a regression model because we did not have covariates on poverty level or accessibility radius to the restaurants and because we did not have a large enough sample size to adjust for variance in the outcome. Statistical significance was set at  $p < .05$ .

## RESULTS

### NEMS-R Comparisons by Restaurant Classification

Table 1 shows the comparison of the healthfulness between fast-food and full-service restaurants, and reports percentages of restaurants within the two restaurant types, having specific healthfulness measures as defined in the NEMS-R survey. Among the restaurants assessed, fast-food restaurants and full-service restaurants had the same likelihood of offering healthy entrees, healthy main salads, and fruits at a lower price than regular entrees. Additionally, of the restaurants surveyed, 100% were compliant with the federal menu labeling mandate, as they all had calorie labels on their online menus. However, full-service restaurants and fast-food restaurants differed across many of the nutrition environment variables. Both fast-food and full-service restaurants offered a healthy entrée and main salad dish. Full-service restaurants are slightly more likely to have non-fried vegetables available and less likely to have baked chips or whole-grain bread available than fast-food restaurants. Full-service restaurants were better than fast-food restaurants in terms of having facilitators for healthy eating. Particularly, full-service restaurants were more likely to offer reduced-sized portions (60.9% compared to 13%,  $p$ -value 0.002). Both restaurants had mixed results regarding barriers to healthy eating. Fast-food restaurants were more likely to encourage large portions (60.9% compared to 17.4%,  $p$ -value 0.006), but ~22% of the

full-service restaurants encouraged all-you-can-eat or unlimited specialties compared to none of the fast-food restaurants. In terms of pricing, fast-food restaurants were more likely to use pricing to encourage overeating by offering combinations of meals that were less expensive than if items were bought separately (56.5% compared to 21.7%,  $p$ -value 0.033).

Table 2 shows the differences in NEMS-R total score and sub-scores by restaurant type. The fast-food restaurants ( $n=23$ ) had a mean total NEMS-R score of 6.65 out of a total possible score of 28. The full-service restaurants ( $n=23$ ) had a mean total NEMS-R score of 7.0 out of a total possible score of 28. The significant difference between fast-food and full-service restaurants pertained to barriers to healthful eating. Full-service restaurants had significantly fewer barriers (NEMS-R sub-score = -0.65;  $p$ -value 0.013) compared to fast-food restaurants (NEMS-R sub-score = -1.26).

## DISCUSSION

After evaluating the healthfulness of menus in both chain fast-food and full-service restaurants in 16 most populated Georgia counties, we found that both types of restaurants have mean total healthfulness scores below the middle range, indicating significant room for improvement in creating a healthful eating environment in chain restaurants. In addition, this study also highlights the specific components of the nutrition environment that needs improvement. While total scores were not significantly different between fast-food and full-service restaurants, fast-food restaurants had higher scores on barriers to healthy eating, but also offered healthy food options. Full-service restaurants are slightly better in the availability of non-fried vegetables. The results of this study could be used to inform policy alternatives for the different restaurant types. Lawmakers should encourage or incentivize fast-food restaurants to focus on modifying their pricing and promotion strategies to decrease the possibility of overeating and help facilitate healthy eating, while full-service restaurants should focus on limiting all-you-can-eat promotions to encourage healthy eating.

This study was conducted close to a year after the compliance date of the federal menu-labeling mandate. Therefore, it informs current research by gauging whether the federal labeling mandate has had an effect to date on the healthfulness of foods available at chain restaurants. Given the compliance date had been in effect for almost a year, there is an expectation that restaurants have adapted and offer plenty of healthy options. Nevertheless, among the restaurants sampled, availability of healthy options remained low, though full-service restaurants did slightly better in offering non-fried vegetables which are considered a key component of a healthy meal than fast-food restaurants. There was room for improvement in facilitators of healthy eating including healthy entrees and reduced portion sizes available.

**Table 1.**

*The Healthfulness of fast-food and full-service restaurants from Nutritional Environment Measures in Restaurants (NEMS-R) survey conducted in 2019*

	Fast-Food (%) (n=23)	Full Service (%) (n=23)	p-value <sup>a</sup>
<b>Main Dishes/Entrees</b>			
Healthy entree available	60.9	60.9	
<b>Main-Dish salads</b>			
Healthy main salads available	26.1	26.1	
<b>Specific foods availability</b>			
Fruit availability	17.4	17.4	
Non-fried vegetable availability	17.4	52.2	
Baked chip availability	13	0	
Whole grain bread availability	34.8	7.14	
<b>Beverages</b>			
Diet soda availability	91.3	87	
100% Fruit juice availability	29.2	17.4	
1% or nonfat milk availability	43.5	26.1	
<b>Kids Menu</b>			
Availability	73.9	95.7	
Healthy choice availability	30.4	43.5	
<b>Facilitators of Healthy Eating</b>			
Nutrition information on menu	100	100	
Health entrees identified on menu	34.8	60.9	
Reduced sized portions available	13	60.9	0.002
<b>Barriers to Healthy Eating</b>			
Large portions encouraged	60.9	17.4	0.006
Menu discourages special requests	0	0	
All you can eat or unlimited available	0	21.7	0.049
<b>Pricing</b>			
Combination meal cheaper than sum price of individual items	56.5	21.7	0.033
Healthy entrees less expensive than regular entrees	13	13	
Designated smaller portion less expensive than regular portion	8.7	8.7	

<sup>a</sup> p-values are from Fisher's Exact Test for dichotomous variables. Only significant p-values are shown in the table.

**Table 2.**

*Examination of Nutritional Environment Measures in Restaurants (NEMS-R) total scores and sub-scores by restaurant type*

	n	Mean total score	Mean sub-scores		
			Availability of healthful options	Facilitators of healthy eating	Barriers to healthful eating
All outlets	46	6.83	3.67	4.09	-0.96
Fast-food	23	6.65	3.97	3.96	-1.26
Full service	23	7	3.39	4.21	-0.65
p-value <sup>a</sup>					0.013

<sup>a</sup> p-values are from t-test. Only significant p-values are shown in the table.

The findings of this study are similar to the findings of other NEMS-R evaluations completed before the menu-labeling mandate (Neckerman et al., 2014; B. E. Saelens et al., 2007). This included a study in the same geographic region (B. E. Saelens et al., 2007). The healthfulness of fast-food and full-service restaurants did not show improvements from the healthfulness in the study conducted in Georgia before the mandatory menu labeling. There is recent evidence from Northeast US that large chain restaurants have eliminated high-calorie items from their menu (Bleich, Moran, Jarlenski, & Wolfson, 2018). This is a positive step towards impacting the healthfulness of the food environment by reducing calorie intake without relying on individual behavior.

The finding that the healthiness of foods in full-service restaurants is no better than fast-food restaurants is unexpected but not surprising. Although fast food is often regarded as junk food or blamed as the main contributor to the obesity epidemic, studies have consistently found that full-service restaurants are not necessarily healthier than fast-food restaurants, which suggests that the overall food environment offers little opportunity for consumers to choose healthy foods. In fact, based on results from the National Health and Nutrition Examination Survey, in 2015–2016, the diet quality of both full-service and fast-food restaurants was low, with mean American Heart Association diet scores of 31.6 and 27.6 (out of 80) (Lui et al. 2020). The problem persists that the average meal at a fast-food restaurant remains at 809 calories and the average meal at a full-service restaurant remains at 1317 calories (Roberts et al., 2018). Therefore, in addition to eliminating high-calorie items, chain restaurants need to make it a policy priority to offer healthier, lower-calorie options.

In addition to a menu-labeling mandate, a complementary mandate could be to regulate restaurants on what they are allowed to define as healthy options limited by calories, grams of fat, and grams of saturated fat. This is important as many of the items in restaurants marked as healthy options may not be healthy items in accordance with the NEMS-R calorie and total grams of fat guidelines. There may be variations in what is considered healthy by restaurants and what is considered healthy options according to individual calories, nutrient requirements, and federal nutrition guidelines; This should further direct policy priorities. When comparing the two types of restaurants, fast-food consumption has been associated with an increased intake of total fat, saturated fat, sugar, sodium, and protein, all contributing to an unhealthy diet (Lui et al. 2020).

There are several strengths to this study. This study used the NEMS-R, which is a widely validated and used tool to measure the healthfulness of menus at restaurants. Due to the timing of this study's conduction falling after the 2018 compliance date of the federal menu-labeling mandate, the findings of this study can be compared to studies prior to the 2018 compliance date to understand the differences in nutrition environment before and after mandatory menu labeling. Limitations to this study include the modification of the NEMS-R protocol to exclude measures that required site visits. Additionally, restaurants were evaluated using

their online menu, which assumes no variations across different physical locations. Lastly, this study only selected highly populated counties in Georgia. The demographics of the highly populated and the lower populated counties are different, and so are their food environments. Furthermore, we did not examine restaurants by poverty level or accessibility radius, which could further impact facilitators and barriers to healthful eating. Future research should assess the healthfulness of foods served in local restaurants in both low, middle, and high-poverty areas with differing walkability or driving distance.

## CONCLUSION

The objective of this study was to assess and compare the healthfulness of fast-food and full-service restaurant environments based on their menus after compliance with the mandatory menu labeling. Both fast-food and full-service restaurants had a moderate total NEMS-R score, which implies much room for improvement, despite the mandated nutrition guidelines. Full-service restaurants had fewer barriers to healthy eating compared to fast-food restaurants. Though all restaurants followed the mandatory menu labeling guidelines, our findings imply that fast-food restaurants lag in eliminating hurdles that may prevent consumers from making better food choice decisions regardless of the calorie labeling. As restaurants continue to remain compliant with the federal labeling mandate, future studies should focus on long-term evaluations of the healthfulness of foods available and evaluate different policy alternatives to improve the healthfulness and nutrition environment of chain restaurants to augment the unhealthy food environment and impact the obesity epidemic.

## Ethical Standards Disclosure

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and this study was exempt from Human Subjects Research as it used secondary de-identified data sets and did not use personal information

## Authorship

Janani Rajbhandari-Thapa, PhD1 conceptualized the study and developed the study protocol. Janani Rajbhandari-Thapa, PhD1 and Donglan Zhang, PhD1 ran the study. Janani Rajbhandari-Thapa, PhD1, and Nicole D. Katapodis, MPH1 wrote the manuscript draft, and Donglan Zhang, PhD1 thoroughly revised the first draft. Melanie Edwards, MS1, and Dana Alvin1 were involved in collecting the data and revising the manuscript. All the authors revised the later drafts of the manuscript.

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