Published in final edited form as:

Am J Health Promot. 2016 March ; 30(4): 242–249. doi:10.1177/0890117116639565.

Correlates of Reported Use and Perceived Helpfulness of Calorie Information in Restaurants Among U.S. Adults

April Oh, PhD, MPH¹, Anh Bao Nguyen, PhD, MPH², and Heather Patrick, PhD³

¹Health Communication and Informatics Research Branch, Behavioral Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, Rockville, MD, USA

²Science of Research and Technology Branch, Behavioral Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, Rockville, MD, USA

³LiveHealthier, Bethesda, MD, USA

Abstract

Purpose: This study reports correlates in reported use and helpfulness of calorie information, when available, in restaurants on a national scale in the United States for demographic behavioral and health-related conditions.

Design: This study is a secondary data analysis of the 2013 National Cancer Institute's Health Information National Trends Survey data.

Setting: United States.

Subjects: Adults ($n = 3407$).

Measures: Menu labeling use and helpfulness; behavior change attempts; reported fruit, vegetable, and soda consumption; weight status; and chronic health conditions.

Analysis: Trends were identified in weighted logistic and linear regression models.

Results: U.S. adults who intended to lose weight (odds ratio [OR] = 5.01 [95% confidence interval 2.96, 8.46]), increase fruit (OR = 1.10 [.66, 1.84]) or vegetable consumption (OR = 2.25 [1.32, 3.83]), or reduce soda consumption (OR = 1.67 [1.11, 2.51]) were more likely to report using menu-labeling information when available. More women reported calorie information was helpful when ordering ($p < .05$). Racial/ethnic and socioeconomic status disparities were identified in use (non-Hispanic [NH] blacks vs. NH whites OR = .43 [.25, .74]) and helpfulness (NH blacks vs. NH whites $\beta = -.06 [-.44, .32]$).

Conclusion: Findings highlight potential subgroups to target for communication and education efforts regarding use of calorie information in restaurants. Following publication of final rules for

Reprints and permissions: sagepub.com/journalsPermissions.nav

Corresponding Author: April Oh, PhD, MPH, Health Communication and Informatics Research Branch, Behavioral Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, 609 Medical Center Drive, MSC 9761 Room 3E612, Rockville, MD 20850, USA (for U.S. postal delivery: Bethesda, MD 20892-9761). april.oh@nih.gov.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

federal menu-labeling legislation and implementation, further surveillance of public response to this information may inform message framing and educational interventions to promote use of calorie information on menu boards.

Keywords

diet; policy; behavior change; disparities; menu labeling; prevention research

Introduction

Chronic diseases such as diabetes, heart disease, and obesity comprise the most common preventable health problems in the United States, accounting for more than 70% of American deaths each year.¹ Lifestyle factors such as lack of physical activity and poor nutrition are largely responsible for the rise in chronic diseases.²

Menu labeling in restaurants could support efforts to prevent chronic diseases by promoting better dietary habits. Currently, more Americans are eating meals outside of the home in sit-down, carry-out, and fast-food restaurants.³ It is estimated that nearly one-third of an average American's total calories comes from foods prepared outside the home. These energy-dense prepared meals comprise an increasing portion of energy intake and poorer nutritional quality, with higher levels of fat, sodium, and calories.^{4,5} A challenge is that consumers often underestimate the caloric value of these meals, particularly large meals,⁶ which contributes to findings that eating outside of the home has been associated with greater body weight.⁷ In fact, epidemiological studies describe a temporal relationship between the growth of restaurants in the 20th century and rising obesity rates.^{8,9}

Two systematic reviews examining the effects of menu labeling on intake and purchasing behaviors report calorie labeling on menus has modest or no effect on ordering and consumption behaviors.^{10,11} In both reviews, implications and areas for further research were identified to advance knowledge on the potential impact of menu labeling on consumer behaviors. Specifically, several studies report that consumers in venues with menulabeling requirements may not be aware of calorie labels, and, further, there may be important sociodemographic differences between those who use menu labeling and those who do not. These studies support the provision of educational materials coinciding with implementation of menu-labeling legislation. Such information could enhance awareness and direction on how to use the information provided to make healthy food choices. Previously discovered null effects between availability of calorie information and food choice behaviors may have to do with limited understanding of how many calories should be consumed in a day, ability to interpret this information in behavioral decision making, and the need for a longer evaluation period following policy implementation to observe behavior change.¹²

In 2010, the Patient Protection and Affordable Care Act (ACA; HR 3590), section 4205, mandated that restaurants and food vendors, as well as vending machines, with more than 20 locations disclose calorie information and make other nutrient composition data available to consumers at point of purchase. Calorie information must be posted on menus, menu boards (including drive-throughs), and food display tags with information on fat, saturated fat, carbohydrates, sodium, protein, and fiber, available in writing and by request.¹³ As of the

writing of this manuscript, the final rules on this legislation have not been posted. However, some restaurants have voluntarily begun posting this information, and prior to this federal legislation, a number of states and localities have implemented their own laws and regulations for menu labeling, including the city of New York and King County, Washington.¹² Federal legislation, once rules are finalized, will set the minimum standards required for menu labeling to be in compliance with the ACA.

As current studies suggest, how this particular legislation may impact or actually change consumer behavior in calories consumed on a national scale remains to be seen. As a first step, it is important to identify current trends in population subgroups that use menulabeling information in food decisions and are likely to find it most useful. This will facilitate further refinement and development of consumer education interventions to promote use of menu labeling in food choice, which has been advocated for in conjunction with the policy, by the public health nutrition community. Although some of this work has been examined in localities¹⁴ and in subpopulations of youth,¹⁵ it has not been examined in a broader sample of adults in the United States.

This study takes advantage of a nationally representative survey, the 2012 National Cancer Institute's Health Information National Trends Survey (HINTS), to examine use of calorie information, when available, in restaurants. The study identifies subpopulations that report using this information and how helpful this information is when making decisions about what to order. This study identifies which subpopulations are more likely to use menu-labeling information, specifically examining demographics, behavioral change attempts, and health-related conditions (e.g., diabetes, high blood pressure, and heart conditions). To our knowledge, no research to date has investigated the use of menu labels among those with chronic conditions. Similar to research on food labeling and consumer decision making,¹⁶ we hypothesize menu-labeling users may have a healthier behavioral profile (e.g., more likely to be currently dieting, more likely to be physically active) or have more diet-related chronic conditions.

This study also examines which populations find menu labeling helpful when making decisions about what to order.

Methods

The data come from cycle 2 of HINTS 4. The HINTS is a nationally representative survey of the U.S. non-institutionalized adult population, aged 18 or older, and follows trends in health-related information and communication and health-related behaviors, perceptions, and knowledge.¹⁷ HINTS 4 comprises four separate data collection cycles that began in 2011 and extended into 2014. Data collection for cycle 2 started on October 9, 2012, and concluded on January 11, 2013.

HINTS 4 collected data through a mail survey based on a stratified probability sample of the U.S. adult, civilian, noninstitutionalized population. The sample was drawn in two stages. The first stage randomly selected addresses from the U.S. Postal Service file of residential addresses. The second stage selected an adult within the selected household using the next

birthday method. To maximize the response rate and the representativeness of the sample, the survey included multiple nonresponse followups, a prepaid incentive at the first mailing, and express delivery as one of the nonresponse follow-up mailings. A Spanish version of the questionnaire was distributed to households that had a Hispanic surname. Respondents received a \$2 monetary incentive for participation.

Survey weights were created to permit analysts to generalize the results to the national population. The first step to create these weights was an adjustment to reflect the selection probabilities. To compensate for nonresponse and coverage error, the selection weights were calibrated using data from the American Community Survey. HINTS nonresponse is correlated with being male, being young, being a member of a racial minority, having less education, and being Hispanic. The calibration used age, gender, educational attainment, race, ethnicity, and census region to adjust for this pattern. An analysis conducted on earlier rounds of HINTS found that nonresponse is also negatively correlated with access to health care and to health status. Those who have had less access to health care services and who have had fewer health problems are less likely to respond to the survey. To compensate for these patterns, insurance status and cancer status were used as additional calibration adjustments. The data to make this adjustment were taken from the National Health Interview Survey.

The overall response rate was 39.9%. The final sample for HINTS 4 cycle 2 is 3630. Additional methodological information is available elsewhere.^{17,18}

Measures

Covariates.—Known covariates with health behaviors assessed in HINTS include demographic items such as age (18–24, 25–34, 35–49, 50+ years), gender (male, female), race/ethnicity (non-Hispanic [NH] white, NH black, Asian and Pacific Islander, Native American, Hispanic), educational attainment (less than a high school diploma, high school or GED [general equivalency diploma] equivalent, some college, college graduate and beyond), marital status (married/living with a partner, never married, divorced/widowed/separated), and children in the household (yes, no). Self-reported body mass index was also calculated and categorized by weight status (normal, over-weight, obese).

Outcome Variables

Use of Menu Information.: To assess use of menu information, participants responded to the item, “When available, how often do you use menu information on calories in deciding what to order?” In order to capture whether respondents rely on menu information or not, we dichotomized responses into two categories: always/often/sometimes and rarely/never.

Perceived Helpfulness of Menu Information.: To assess perceived helpfulness of menu information, among participants who reported using menu information, participants responded to the item, “When available, how helpful do you find menu information on calories in deciding what to order?” Response options were coded as 1 = not at all helpful, 2 = a little helpful, 3 = helpful, 4 = very helpful, and 5 = extremely helpful.

Predictor Variables

Health Confidence.: We measured respondents' level of confidence in managing their own health with one item, "Overall, how confident are you about your ability to take good care of your health?" Response options were coded as 1 = not confident at all, 2 = a little confident, 3 = somewhat confident, 4 = very confident, and 5 = completely confident.

Daily Fruit and Vegetable Consumption.: Daily fruit and vegetable consumption was captured by two items, "About how many cups of fruits (including 100% pure fruit juice) do you eat or drink each day?" and "About how many cups of vegetables (including 100% pure vegetable juice) do you eat or drink each day?"

Behavioral Change Attempts.: Self-report measures of behavioral change included whether respondents made intentional changes/maintenance in four domains: weight loss, vegetable consumption, fruit consumption, and soda consumption. To assess change, participants read items that asked, "At any time in the past year, have you intentionally tried to ... " and chose responses relevant to the specific domain.

The responses for the relevant domains are provided in the following format: domain-specific item (response categories). Behavior change attempts was assessed for weight (lose weight/maintain weight/gain weight/ you haven't really paid attention), fruit consumption (increase the amount of fruit you eat or drink/maintain the same amount of fruit you eat or drink/ you haven't really paid attention to the amount of fruit you eat or drink each day), vegetable consumption (increase the amount of vegetables you eat or drink/maintain the same amount of vegetables you eat or drink/you haven't really paid attention to the amount of vegetables you eat or drink each day), and soda consumption (decrease the amount of regular soda or pop you usually drink in a week/maintain the same amount of regular soda or pop you usually drink a week/you haven't really paid attention to the amount of regular soda or pop you usually drink in a week).

Medical Conditions.: Diagnosis of medical conditions was assessed with items that asked, "Has a doctor or other health professional ever told you that you had any of the following medical conditions: (1) diabetes or high blood sugar?, (2) high blood pressure or hypertension?, and (3) a heart condition such as heart attack, angina, or congestive heart failure?" Response options were coded as 1 = yes and 0 = no.

Interaction Effects.: Three product terms were created to test for the interaction of medical conditions and health confidence: (1) diabetes X health confidence, (2) high blood pressure X health confidence, and (3) heart condition X health confidence.

Analyses

All analyses were conducted using SAS 9.3 and SAS-callable SUDAAN 10.0 statistical software (Cary, North Carolina) to account for the complex sampling design of the HINTS. Survey weights (final survey weights and replicate weights) were used to obtain population-level point estimates and accurate variance estimates. All p values reported are for two-tailed tests and a value of <.05 was considered statistically significant. Weighted logistic and linear

regression models were conducted to examine whether health confidence, daily fruit and vegetable consumption, attempted behavioral change/maintenance items, medical conditions, and higher-order interaction effects were associated with use of menu information and perceived helpfulness of menu information while adjusting for selected covariates. To ensure higher validity of self-reported responses, we excluded participants who reported having difficulty concentrating, remembering, or making decisions due to a physical, mental, or emotional condition. Respondents who did not report data for the outcome variables (use of menu information .2% missing; perceived helpfulness of menu information 1.2%) were excluded from analysis. Survey weights were applied to allow for population-level estimates for the United States.

Results

Table 1 provides the descriptive characteristics of respondents (n = 3407). Table 2 provides results for analyses involving use of menu-labeling information. As shown, higher levels of education were associated with increased likelihood of use of menu information. NH white respondents were more likely than NH black respondents to use menu information. Greater fruit and vegetable consumption was associated with higher likelihood of use of menu information. Respondents who reported engaging in change/maintenance with regard to weight, fruit consumption, vegetable consumption, and soda consumption were more likely to use menu information. Lastly, there was a significant interaction between health confidence and high blood pressure status. As shown in the Figure 1, for those without high blood pressure, high confidence in one's ability to take good care of one's health was associated with higher likelihood of using menu information. However, this effect was not found among those diagnosed with high blood pressure. Table 3 reports the results of models examining characteristics associated with perceived helpfulness of menu-labeling information. Respondents who were women and respondents who engaged in weight loss behavior reported greater perceived helpfulness of menu information.

Discussion

This study reports on current trends in use and reported helpfulness of menu labeling using the 2013 HINTS study data in U.S. adults. Findings from this study suggest important public health implications for future evaluations of the impact of U.S. menulabeling legislation. Findings may also inform relevant menu-labeling health interventions and programs to maximize the reach and impact of menu labeling.

Similar to prior evidence suggesting that motivated consumers will seek nutritional information,¹⁹ the findings from this study indicate that consumers who have recently attempted or are currently attempting to make positive health behavior change are more likely to report using calorie information. Respondents who had actively made attempts to change their behavior (i.e., increase vegetable consumption, reduce soda consumption, and lose weight) were more likely to report use of menu-labeling information, regardless of their weight status. Likewise, healthier population subgroups with good health behaviors (those consuming more fruits and vegetables) were more likely to report use of menu labeling. Prior studies suggest these respondents could be more aware of calorie information and may

be more likely to understand and seek this information given their reported healthier behavior.^{20,21}

One of the aims of this study was to understand use of menu labeling among U.S. populations reporting chronic health conditions, which could benefit from menu labeling to make informed healthful choices when ordering. Although we expected more reported use of calorie information from those with diet-related health conditions, results from this study did not find an association between diagnosis of chronic conditions and use of menu labeling. However, a significant hypertension by confidence in taking care of one's health interaction emerged: for those who were not diagnosed with high blood pressure, high confidence in taking care of one's health was associated with use of menu labeling, but this was not the case for those diagnosed with high blood pressure. Confidence in taking care of one's health has a strong influence on ability to seek and use health information.²² Perhaps having a chronic condition may lower one's self-efficacy in strategies to manage and maintain a healthy lifestyle. Alternatively, given the tendency for hypertension to be relatively asymptomatic, people may not consciously perceive a connection between their behavior and illness management on a daily basis.

Although this population could benefit from using calorie information in reducing their risk and managing their chronic disease, lack of significant findings suggest there may be other barriers to use of this information or lack of knowledge in how to use this information. Future directions for research could evaluate the unique barriers to use of this menu-labeling information among those with chronic disease as well as understanding decision-making processes and patient activation to take charge of one's health.²³

Federal legislation (ACA) will require placement of statements on suggested daily caloric consumption. The intent of these statements is to increase helpfulness of calorie information in ordering decision making. Among those reporting attempts to change behavior, although they were more likely to use calorie information, they were not significantly more likely to find this information helpful. These findings identify a potential need to examine the way the information is presented to promote helpfulness of calorie information when ordering foods in restaurants. Consumer education on how to use calorie information would be an important intervention/ communication campaign in conjunction with the legislation. Studies have documented that consumers don't understand how to use calorie information within the context of their daily caloric consumption or to maintain healthy weight.^{16,20,24} One novel approach in adapting calorie information to promote healthy behaviors is including both item calorie content and the amount of physical activity required to burn the calories. A study found that participants who were exposed to both types of information ordered significantly less calories in comparison to those who were only exposed to calorie content.^{25–27} Supplementing caloric information may help to enhanced reported helpfulness of calorie information.

Findings on gender differences were consistent with prior studies.^{14,15} Women were more likely to find calorie information helpful when available. These findings parallel research reporting greater use of nutritional labeling among women.²⁸ However, unlike nutritional

labeling, in this study, having children in the household was not significant in menu labeling use.

Several subpopulations were identified for which more targeted efforts to increase use of menu labeling may be warranted. These were NH blacks and those of lower education. Targeted efforts in these groups may be of particular importance given the documented disparities in obesity, food insecurity, and confusion in reading labels.²⁹ Further, although prior studies have reported that young adults are the greatest consumers of fast foods,³⁰ in this study, age was not significantly associated with use of calorie information on menus.

At the time HINTS data were collected, menu-labeling regulations were in place for 21 municipalities around the country.¹¹ Estimates for the percentage of respondents who report using menu-labeling information when ordering may be conservative because menu-labeling legislation was not implemented at a national level. Yet given the high proportion of respondents reporting use of this information, once menu-labeling legislation is in effect, findings suggest a potentially great population impact on potential use of this information when ordering.

Several limitations should be noted. First, this examination occurred following the implementation of the law, but prior to the finalization of specific rules. Consequently, this study provides important baseline information, as it reports current trends in use and helpfulness of calorie information, but does not constitute an evaluation of the ACA. Second, this study is limited by not having information on what type of restaurants respondents are going to, how often, what was ordered, and calories consumed.

Some literature suggests that those who eat at restaurants less frequently report the greatest use of calorie information.³¹ These data were not available in the dataset. Third, data on exposure to menu labeling in restaurants were not available. There is no national monitoring system of restaurants that post calorie information on menu boards and this information was not in HINTS. However, using the reported region of respondents, we examined if there were significant differences by region on reported use of menu labeling and a difference was not found (χ^2 14.96, p .075). Finally, this study is self-reported data and cross-sectional. There may be biases in recall and self-report, and social desirability may have influenced responses as menu labeling has received increased news media attention and high public support.³² However, these data are an example of the value of surveillance data in policy evaluation. Future iterations of HINTS will include data collection on use and helpfulness of menu labeling that can be compared with results of this study as a baseline for comparison on use and reported helpfulness of menu labeling following legislation implementation.

It is worth noting that menu labeling can have multiple outcomes for evaluation and impact on public health. Both intended and unintended outcomes may be observed. Legislation can impact the types of food and meal options available in restaurants and other food service industries. Some evidence shows that menu labeling can impact foods served in restaurants by communicating a priority for healthier options for the public.³³ For example, following menu-labeling legislation in King County, sit-down and chain restaurants began offering reduced saturated fat and sodium in foods sold, although this content still exceeded dietary

guidelines.³⁴ The other potential benefit of this legislation could also include reformulation of foods by the restaurant industry to offer lower-calorie options.^{11,35} For public health researchers and practitioners, although menu-labeling information could also raise demand for more healthy choices from the restaurant and food industry, researchers and practitioners should also monitor how purchasing and consumption patterns may also change in other venues.

Access to calorie information at the point of purchase on menu boards enables consumers to make more informed choices about foods that they purchase, and for motivated individuals, this could help them achieve health goals for eating healthy. With more Americans eating outside of the home, this study identifies targeted populations for which menu labeling may have the greatest potential impact. Those attempting to change their behaviors may be the first users and most responsive to menu-labeling legislation. Targeted educational campaigns with these subgroups can increase the potential for perceived helpfulness of this information and ultimately for behavior change.

Acknowledgments

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Hoyert DL, Xu JQ. Deaths: Preliminary data for 2011. *Natl Vital Stat Rep* 2012;61(6):1–51.
2. Bodenheimer T, Chen E, Bennett HD. Confronting the growing burden of chronic disease: can the US health care workforce do the job? *Health Aff (Millwood)* 2009;28:64–74. [PubMed: 19124856]
3. Todd JE, Mancino L, Lin BH. The Impact of Food Away From Home on Adult Diet Quality. Economic Research Report No. ERR-90 Washington, DC: US Dept of Agriculture; 2010.
4. French SA, Story M, Jeffery RW. Environmental influences on eating and physical activity. *Annu Rev Public Health* 2001;22: 309–335. [PubMed: 11274524]
5. Urban LE, Lichtenstein AH, Gary CE, et al. The energy content of restaurant foods without stated calorie information. *JAMA Intern Med* 2013;14:1–8.
6. Block JP, Condon SK, Kleinman K, et al. Consumers' estimation of calorie content at fast food restaurants: cross sectional observational study. *BMJ* 2013;346:f2907. [PubMed: 23704170]
7. Bezerra IN, Curioni C, Sichieri R. Association between eating out of home and body weight. *Nutr Rev* 2012;70:65–79. [PubMed: 22300594]
8. Rosenheck R Fast food consumption and increased caloric intake: a systematic review of a trajectory towards weight gain and obesity risk. *Obes Rev* 2008;9:535–547. [PubMed: 18346099]
9. Pereira MA, Kartashov AI, Ebbeling CB, et al. Fast-food habits, weight gain, and insulin resistance (the CARDIA study): 15-year prospective analysis. *Lancet* 2005;365:36–42. [PubMed: 15639678]
10. Swartz JJ, Braxton D, Viera AJ. Calorie menu labeling on quick-service restaurant menus: an updated systematic review of the literature. *Int J Behav Nutr Phys Act* 2011;8:135. [PubMed: 22152038]
11. Harnack LJ, French SA. Effect of point-of-purchase calorie labeling on restaurant and cafeteria food choices: a review of the literature. *Int J Behav Nutr Phys Act* 2008;5:51. [PubMed: 18950529]
12. Krieger JW, Chan NL, Saelens BE, et al. Menu labeling regulations and calories purchased at chain restaurants. *Am J Prev Med* 2013;44:595–604. [PubMed: 23683977]

13. Patient Protection and Affordable Care Act, Pub L 111–148, HR 3590. Nutrition labeling of standard menu items at chain restaurants, Sec. 4205 Washington, DC: US Government Publishing Office; 2010.
14. Dumanovsky T, Huang CY, Bassett MT, Silver LD. Consumer awareness of fast-food calorie information in New York City after implementation of a menu labeling regulation. *Am J Public Health* 2010;100:2520–2525. [PubMed: 20966367]
15. Wethington H, Maynard LM, Blanck HM. Use of calorie information at fast food and chain restaurants among US youth aged 9–18 years, 2010. *J Public Health (Oxf)* 2013;35:354–360. [PubMed: 23697388]
16. Campos S, Doxey J, Hammond D. Nutrition labels on prepackaged foods: a systematic review. *Public Health Nutr* 2011; 14:1496–1506. [PubMed: 21241532]
17. Rutten LJ, Davis T, Beckjord EB, et al. Picking up the pace: changes in method and frame for the Health Information National Trends Survey (2011–2014). *J Health Commun* 2012;17:979–989. [PubMed: 23020763]
18. National Cancer Institute. Health Information National Trends Survey Available at: <http://hints.cancer.gov/>. Accessed October 23, 2014.
19. Howlett EA, Burton S, Bates K, Huggins K. Coming to a restaurant near you? Potential consumer responses to nutrition information disclosure on menus. *J Consum Res* 2009;6:494–503.
20. Burton S, Creyer E. What consumers don't know can hurt them: consumer evaluations and disease risk perceptions of restaurant menu items. *J Consum Aff* 2004;38:121–145.
21. Kozup J, Burton S, Creyer EH. The provision of trans fat information and its interaction with consumer knowledge. *J Consum Aff* 2006;40:163–176.
22. Baker DW, Williams MV, Parker RM, et al. Development of a brief test to measure functional health literacy. *Patient Educ Couns* 1999;38:33–42. [PubMed: 14528569]
23. Nijman J, Hendriks M, Brabers A, et al. Patient activation and health literacy as predictors of health information use in a general sample of Dutch health care consumers. *J Health Commun* 2014; 19:955–969. [PubMed: 24397280]
24. Krukowski RA, Harvey-Berino J, et al. Consumers may not use or understand calorie labeling in restaurants. *J Am Diet Assoc* 2006; 106:917–920. [PubMed: 16720133]
25. Bleich SN, Pollack KM. The publics' understanding of daily caloric recommendations and their perceptions of calorie posting in chain restaurants. *BMC Public Health* 2010;10:121. [PubMed: 20214811]
26. Dowray S, Swartz JJ, Braxton D, Viera AJ. Potential effect of physical activity based menu labels on the calorie content of selected fast food meals. *Appetite* 2013;62:173–181. [PubMed: 23220355]
27. Ellison B, Lusk JL, Davis D. Looking at the label and beyond: the effects of calorie labels, health consciousness, and demographics on caloric intake in restaurants. *Int J Behav Nutr Phys Act* 2013; 10:21. [PubMed: 23394433]
28. Blitstein JL, Evans WD. Use of nutrition facts panels among adults who make household food purchasing decisions. *J Nutr Educ Behav* 2006;38:360–364. [PubMed: 17142192]
29. Jackson CL, Szklo M, Yeh HC, et al. Black-white disparities in overweight and obesity trends by educational attainment in the United States, 1997–2008. *J Obes* 2013;140–743.
30. Powell LM, Nguyen BT, Han E. Energy intake from restaurants: demographics and socioeconomic, 2003–2008. *Am J Prev Med* 2012;43:498–504. [PubMed: 23079172]
31. Variyam JN. Nutrition Labeling in the Food-Away-From-Home Sector Washington, DC: US Dept of Agriculture; 2005.
32. Roberto CA, Schwartz MB, Brownell KD. Rationale and evidence for menu-labeling legislation. *Am J Prev Med* 2009;37: 546–551. [PubMed: 19944923]
33. Namba A, Auchincloss A, Leonberg BL, Wootan MG. Exploratory analysis of fast-food chain restaurant menus before and after implementation of local calorielabeling policies, 2005–2011. *Prev Chronic Dis* 2013;10:E101. [PubMed: 23786908]
34. Bruemmer B, Krieger J, Saelens BE, Chan N. Energy, saturated fat, and sodium were lower in entrees at chain restaurants at 18 months compared with 6 months following the implementation of

mandatory menu labeling regulation in King County, Washington. *J Acad Nutr Diet* 2012;112:1169–1176. [PubMed: 22704898]

35. Vadiveloo MK, Dixon LB, Elbel B. Consumer purchasing patterns in response to calorie labeling legislation in New York City. *Int J Behav Nutr Phys Act* 2011;8:51. [PubMed: 21619632]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Prior studies have shown mixed results with modest or no effect of menu labeling on intake and purchasing behaviors.

What does this article add?

Data were collected at a national level and provided important baseline information on national use and helpfulness of menu labeling prior to ACA section 4205 implementation. Important subgroups at a national level were identified that can be used for focused outcome evaluation of the policy and public health efforts to promote use. Higher levels of education were associated with increased likelihood of use of menu information. NH white respondents were more likely than NH black respondents to use menu information. Greater fruit and vegetable consumption was associated with higher likelihood of use of menu information. Respondents who reported engaging in change/maintenance with regard to weight, fruit consumption, vegetable consumption, and soda consumption were more likely to use menu information.

What are the implications for health promotion practice or research?

Those attempting to change their behaviors may be the first users and most responsive to menu-labeling legislation. Several subpopulations were identified for which more targeted efforts to increase use of menu labeling may be warranted. These were NH blacks and those of lower education. Targeted efforts in these groups may be of particular importance given the documented disparities in obesity, food insecurity, and confusion in reading labels.

Figure 1.
The Interactive Effects of High Blood Pressure Status on Health Confidence to Take Care of One's Health and Use of Menu Information.

Table 1.**Demographic Characteristics (n = 3407) ***

Demographic	No. (%)[†]
Gender	
Male	1384 (50.2)
Female	2023 (49.8)
Race/ethnicity	
Non-Hispanic white	2183 (68.4)
Black	614 (12.8)
Asian	132 (5.4)
American Indian or Alaskan Native	27 (1.0)
Hispanics	456 (12.4)
Educational attainment	
Less than high school	329 (13.5)
High school diploma/GED equivalent	775 (20.3)
Some college	1057 (37.6)
College degree +	1380 (28.6)
Age, y	
18–24	105 (12.9)
25–34	424 (17.6)
35–49	845 (26.4)
50+	2138 (43.0)
Marital status	
Married/living with partner	1857 (57.2)
Divorced/separated/widowed	1043 (15.7)
Never married/single	628 (27.2)
Children in household	
Yes	977 (36.2)
No	2282 (63.8)
Annual household income, \$	
<15,000	536 (16.4)
15,000–34,999	705 (20.4)
35,000–74,999	983 (32.3)
75,000–99,999	376 (12.1)
100,000–199,999	427 (15.0)
200,000+	123 (3.8)
Body mass index	
Normal (18.5–24.9)	1276 (40.4)
Overweight (25–29.9)	957 (28.2)
Obese (30+)	1111 (31.5)
Diagnosed with diabetes	
Yes	659 (14.6)

Demographic	No. (%) [†]
No	2827 (85.4)
Diagnosed with high blood pressure	
Yes	1499 (35.2)
No	1998 (64.8)
Diagnosed with heart condition	
Yes	359 (7.2)
No	3140 (92.8)
Use menu labeling	
Yes	1854 (52.57)
No	1767 (47.43)
Helpfulness of menu labeling	
Not at all helpful	103 (4.37)
A little helpful	623 (24.68)
Helpful	818 (35.97)
Very helpful	509 (23.07)
Extremely helpful	290 (11.91)

* GED indicates general equivalency diploma.

[†] Counts are unweighted and proportions are weighted.

Table 2.

Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for the Odds of Reporting Menu Labeling Use (“Always/Often/Sometimes” Versus “Rarely/Never”) When Making Decisions About What to Order in Restaurants*

Demographic	OR	95% CI
Gender (ref: male)		
Female	1.19	0.82, 1.72
Marital status (ref: married/living with partner)		
Single/never married	1.27	0.81, 1.99
Divorced/widowed/separated	0.89	0.57, 1.40
Educational attainment (ref: <HS diploma)		
HS diploma or GED	0.52	0.26, 1.02
Some college	0.92	0.52, 1.62
College graduate	1.47	0.77, 2.84
Age in years (ref: 18–24)		
25–34	1.40	0.64, 3.08
35–49	1.06	0.49, 2.27
50+	1.33	0.59, 3.00
Race/ethnicity (ref: non-Hispanic white)		
Non-Hispanic black	0.43	0.25, 0.74
Asian/Pacific Islander	0.84	0.43, 1.65
American Indian/Alaska Native	0.30	0.03, 2.94
Hispanic	1.20	0.67, 2.14
Children in household (ref: no)		
Yes	0.72	0.46, 1.12
Body mass index (ref: healthy weight)		
Overweight	0.87	0.56, 1.34
Obese	1.05	0.66, 1.65
Health confidence	1.30	0.97, 1.74
Daily fruit intake	1.17	1.00, 1.38
Daily vegetable intake	1.19	1.02, 1.38
Weight intention (ref: haven’t paid attention)		
Lose weight	5.01	2.96, 8.46
Maintain weight	3.24	1.95, 5.37
Fruit intention (ref: haven’t paid attention)		
Increase intake	1.10	0.66, 1.84
Maintain intake	1.39	0.82, 2.37
Vegetable intention (ref: haven’t paid attention)		
Increase intake	2.25	1.32, 3.83
Maintain intake	2.11	1.28, 3.49
Soda intention (ref: haven’t paid attention)		
Decrease intake	1.67	1.11, 2.51

Demographic	OR	95% CI
Maintain intake	1.64	1.05, 2.55
Diabetes (ref: no)		
Yes	0.53	0.10, 2.86
High blood pressure (ref: no)		
Yes	3.53	0.78, 15.99
Heart condition (ref: no)		
Yes	0.18	0.00, 8.60
Health confidence × diabetes	1.25	0.80, 1.98
Health confidence × high blood pressure	0.67	0.46, 0.98
Health confidence × heart condition	1.48	0.59, 3.72

*ref indicates reference; HS, high school; and GED, general equivalency diploma.

Table 3.

β and 95% Confidence Intervals (CIs) for Reported Perceived Helpfulness of Menu Labeling, HINTS 4 Adult Sample, n = 1303*

Demographic	β	95% CI
Gender (ref: male)		
Female	0.20	0.04, 0.36
Marital status (ref: married/living with partner)		
Single/never married	0.02	-0.23, 0.27
Divorced/widowed/separated	-0.12	-0.33, 0.09
Educational attainment (ref: <HS diploma)		
HS diploma or GED	-0.19	-0.56, 0.17
Some college	-0.27	-0.64, 0.10
College Graduate or More	0.02	-0.35, 0.39
Age, y (ref: 18–24)		
25–34	-0.17	-0.65, 0.31
35–49	-0.18	-0.70, 0.33
50+	-0.16	-0.58, 0.25
Race/ethnicity (ref: non-Hispanic white)		
Non-Hispanic black	-0.06	-0.44, 0.32
Asian/Pacific Islander	0.10	-0.48, 0.68
American Indian/Alaska Native	0.65	-1.57, 2.87
Hispanic	0.16	-0.19, 0.51
Children in household (ref: no)		
Yes	0.02	-0.22, 0.26
Body mass index (ref: healthy weight)		
Overweight	-0.14	-0.41, 0.13
Obese	-0.31	-0.58, -0.04
Health confidence	0.19	0.01, 0.37
Daily fruit intake	0.02	-0.08, 0.11
Daily vegetable intake	0.05	-0.04, 0.14
Weight intention (ref: haven't paid attention)		
Lose weight	0.38	0.09, 0.67
Maintain weight	0.12	-0.21, 0.44
Fruit intention (ref: haven't paid attention)		
Increase intake	0.15	-0.17, 0.46
Maintain intake	0.15	-0.12, 0.42
Vegetable intention (ref: haven't paid attention)		
Increase intake	0.17	-0.13, 0.48
Maintain intake	0.07	-0.26, 0.41
Soda intention (ref: haven't paid attention)		
Decrease intake	0.07	-0.12, 0.26
Maintain intake	0.00	-0.27, 0.26

Demographic	β	95% CI
Diabetes (ref: no)		
Yes	-0.27	-1.31, 0.77
High blood pressure (ref: no)		
Yes	0.60	-0.36, 1.56
Heart condition (ref: no)		
Yes	-0.39	-2.35, 1.56
Health confidence $\times$ diabetes	0.11	-0.16, 0.37
Health confidence $\times$ high blood pressure	-0.18	-0.43, 0.07
Health confidence $\times$ heart condition	-0.02	-0.48, 0.45

* Perceived helpfulness of menu labeling was measured by the item: "When available, how helpful do you find menu information on calories in deciding what to order?" Response options were coded as: 1 = not at all helpful, 2 = a little helpful, 3 = helpful, 4 = very helpful, and 5 = extremely helpful. Respondents included in the sample responded "always/often/sometimes" to "When available, how often do you use menu information on calories in deciding what to order?" HINTS indicates Health Information National Trends Survey; ref, reference; HS, high school; and GED, general equivalency diploma.