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Eating Well While Dining Out: Collaborating with Local Restaurants to Promote Heart Healthy Menu Items

Linden M. Thayer[1], **Daniela C. Pimentel**[2], **Janice C. Smith**[3], **Beverly A. Garcia**[3], **Laura Lee Sylvester**[4], **Tammy Kelly**[5], **Larry F. Johnston**[3], **Alice S. Ammerman**[2,3], and **Thomas C. Keyserling**[6]

[1]Duke University – Center for Advanced Hindsight; 334 Blackwell Street, Suite 320, Durham, NC 27701-3971

[2]University of North Carolina – Chapel Hill, Department of Nutrition; 135 Dauer Drive 2200 McGavran-Greenberg Hall, CB #7461, Chapel Hill, NC 27599-7461

[3]University of North Carolina – Chapel Hill Center for Health Promotion and Disease Prevention; 1700 Martin Luther King Jr. Blvd., CB#7426, Chapel Hill NC 27599-7426

[4]Lenoir County Cooperative Extension; 1791 NC Highway 11 55, Kinston, NC 28504

[5]Kinston-Lenoir Chamber of Commerce; 301 N. Queen St, Kinston, NC 28501

[6]University of North Carolina – Chapel Hill, Department of Medicine; 125 MacNider Hall, CB #7005 Chapel Hill NC 27599-7005

Abstract

Background—As Americans commonly consume restaurant foods with poor dietary quality, effective interventions are needed to improve food choices at restaurants.

Purpose—To design and evaluate a restaurant-based intervention to help customers select and restaurants promote heart healthy menu items with healthful fats and high quality carbohydrates.

Methods—The intervention included table tents outlining 10 heart healthy eating tips, coupons promoting healthy menu items, an information brochure, and link to study website. Pre and post intervention surveys were completed by restaurant managers and customers completed a brief "intercept" survey.

Results—Managers (n = 10) reported the table tents and coupons were well received, and several noted improved personal nutrition knowledge. Overall, 4214 coupons were distributed with 1244 (30%) redeemed. Of 300 customers surveyed, 126 (42%) noticed the table tents and of these, 115 (91%) considered the nutrition information helpful, 42 (33%) indicated the information influenced menu items purchased, and 91 (72%) reported the information will influence what they order in the future.

Discussion—The intervention was well-received by restaurant managers and positively influenced menu item selection by many customers.

Corresponding Author: Thomas C. Keyserling, 125 MacNider Hall, CB #7005 Chapel Hill NC 27599-7005. Chapel Hill NC 27599. (e) jato@med.unc.edu.

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Translation to Health Education Practice—Further research is needed to assess effective strategies for scaling up and sustaining this intervention approach.

BACKGROUND

Cardiovascular (CVD) is the leading cause of death in the US[1] with rates highest among low-income Americans, as well as in certain geographic regions, including the "stroke belt" of the southeastern US.[2–7] (The "stroke belt" was first identified in 1965[8] as a region in the southeastern US with approximately 50% higher stroke rate mortality, with even higher rates identified in a "buckle" region including the coastal plain of North and South Carolina and Georgia, where rates are approximately twice the national average.[5]) Dietary behaviors strongly predict CVD risk,[9] and dietary change interventions can improve CVD risk factors[10] and substantially lower the risk for CVD events.[11] However, most dietary interventions to reduce CVD risk target individuals, often in clinical settings.[10] The Socio-Ecological Model[12,13] recognizes the importance of both individual and social environmental factors as targets for health promotion interventions[14,15] and posits that the most effective approach leading to healthy behaviors includes interventions directed at all levels of the model—individual, interpersonal, institutional, community, and public policy. Thus, innovative intervention approaches at the community level are needed to complement individual level approaches targeting lifestyle behavior change to reduce CVD risk, especially in very high risk regions of the country such as the stroke belt of the southeastern US.

Among US adults, a substantial percentage of energy intake is derived from food purchased at restaurants.[16] In 2007–2008, the contribution of energy intake from restaurant food was 24% of total energy intake (13% from fast-food and 11% from full-service restaurants).[17,18] As such a large percentage of food is purchased at restaurants and because food purchased at restaurants is typically associated with poorer dietary indicators,[18] improving the diet quality of restaurant purchased food has the potential to materially reduce the risk for CVD and other chronic conditions.

As outlined in a recent systematic review of community-based restaurant interventions to promote healthy eating by Valdivia Espino et al,[19] which evaluated 25 studies (27 interventions) published from 1979 to 2014, restaurant interventions typically focus on point of purchase information, promotion and communication, increased availability of healthy choices, reduced prices and coupons, catering policy, and increased access. The authors note that the evidence about the effectiveness of the interventions is limited, especially in rural areas where few studies have been conducted. However, there is sufficient evidence "to support the implementation of interventions that pair point of purchase information with increased availability of healthy choices."[19] Additionally, consistent with prior recommendations and guidelines,[20,21] 19 of the 27 interventions (70%) included in this systematic review promoted low fat/low-cholesterol selections. However, dietary recommendations have changed significantly since that time, and none of the previous studies have evaluated interventions promoting restaurant menu items high in healthful fats (polyunsaturated and monounsaturated fats primarily from plant sources and fish)[9] which are now recognized by dietary guidelines as an important component of a healthful diet.[22]

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PURPOSE

The objectives of this study were to: 1) assess the feasibility and acceptability of a community-based intervention conducted in rural NC to promote selection of healthy restaurant menu items (in both chain and non-chain restaurants) through a pilot program, followed by a larger study; 2) examine the effect of the intervention on restaurant manager attitudes towards and knowledge about healthy menu items; 3) examine the effect of the intervention on restaurant menu items selected by customers; and 4) highlight the latest in heart health nutrition recommendations[9,11,23–25] at participating restaurants as part of a larger community-based intervention.[26] In this paper, we report the results of a pilot and expanded follow-up study designed to address these objectives.

METHODS

The major objective of the Heart Healthy Lenoir (HHL) project was to reduce cardiovascular disease risk and risk disparities in Lenoir County, located in the buckle of the "stroke belt"[5] in eastern North Carolina. The study was funded by the National Heart, Lung, and Blood Institute (NHLBI) as part of an initiative with the National Cancer Institute "to develop and test multilevel interventions to reduce health disparities, to use community-based participatory research principles, to train a new generation of transdisciplinary researchers in collaborative team science, and to promote translation and broad dissemination of evidence-based strategies into practice and policy."[27] Within this framework, HHL included three coordinated studies:[26] a study to improve dietary and physical activity behaviors relevant to CVD risk reduction (the lifestyle study), a study to improve blood pressure management at local practices,[28] and a study to examine associations between genetic markers and change in CVD risk factors.

Consistent with objectives of the funding initiative, the lifestyle study included components targeting various levels of the Socio-Ecological Model. At the individual and interpersonal level, an intervention study[29] was conducted to assess the acceptability and effectiveness of a lifestyle program designed to improve dietary and physical activity behaviors and facilitate weight loss, as appropriate. The intervention promoted a Mediterranean-style diet pattern adapted for the southeastern US, enrolled 339 community members, and was given over a 2-year period. At the policy level of the Socio-Ecological Model, a formative study was conducted with community representatives about the "winnability" of proposed obesity-prevention environmental and policy change strategies in Lenoir County, North Carolina.[30] In addition, HHL included a variety of activities directed at the community level of the Socio-Ecological Model. First, to better understand community level barriers and facilitators of lifestyle change, structured interviews were conducted with residents and community leaders[26] and a Photovoice project was conducted with community adults and adolescents.[31] Second, in an effort to raise community awareness about healthy eating, over a 3 year period HHL hosted booths at the annual barbeque festival and "living the good life" festival (at the local shopping mall) that provided information on healthy eating and taste testing of heart healthy foods. Third, in a more systematic and comprehensive effort to improve nutrition in the larger community, HHL researchers collaborated with the study's Community Advisory Committee (CAC) on the restaurant intervention described in this paper. Together, they

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decided working with restaurants afforded an opportunity to reach many residents when they were primed to make decisions about food consumption. With input and assistance from the local Chamber of Commerce, especially in regard to engaging local restaurants, the CAC and HHL researchers developed the protocol for the pilot and expanded studies, which were approved and monitored by the University of North Carolina at Chapel Hill institutional review board. The time line for these studies is depicted in Figure 1.

Initial Planning Session with Restaurant Owners/Managers

Chamber of Commerce staff helped identify and invite restaurant owners and managers to a focus group to discuss the study. Chamber staff were invited to identify owners and managers from small and large locally owned restaurants as well as national fast food restaurants. A total of six attended, including one manager of a national fast food chain. Attendees appreciated the brief update given on the importance of regular consumption of high quality fats as an important component of a heart healthy diet, and while some were skeptical about customer interest in healthier restaurant food choices, supported efforts to inform their customers of healthy food items already on their menus. In addition, they agreed with plans for the study to distribute educational information at their restaurants and use coupons to promote healthful choices.

Pilot Study Recruitment

All licensed restaurants in the county, per the county health department listing, received a mailed invitation to take part in this study. This mailing described the purpose of the study and what would be required of restaurants that agreed to participate. Three expressed interest in participating (one fast-food chain restaurant and two independent restaurants) and comprised the sample for the pilot study. All served breakfast and lunch (one also served dinner), with the bulk of their business focused on lunch.

Pilot Study Intervention

The overall goal of the intervention was to use local restaurants as a venue to provide patrons with evidence-informed information[9,11,32] on making healthful choices when dining out. In this regard, we included specific tips on menu choices at each restaurant to help customers choose food items with high quality fats (polyunsaturated and monounsaturated fats primarily from plant sources and fish), good carbohydrate quality (fruits, vegetables, and whole grains), or both. For example, many of the restaurants offered whole wheat buns or bread as an option and served chicken salad, so a heart healthy menu suggestion at these restaurants included chicken salad on whole wheat. Almost all restaurants had salads on the menu, so these were recommended with regular full fat salad dressing (made with vegetables oils) instead of low fat or not fat salad dressing (which typically includes high fructose corn syrup). At the participating Mexican restaurant, one of our recommendations was "Guacamole dip is made of avocados - a delicious heart healthy food."

Intervention components included: 1) table tents with 10 healthy eating tips on one side, and more detailed information about a single tip on the other side, including a listing of relevant menu items for this tip (Table 1); 2) trifold pamphlets located at cash registers or in other prominent places that helped customers assess their individual dietary habits with linked tips

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to improve dietary choices, as appropriate; 3) a HHL window decal to alert customers to the restaurant's participation in this study; and 4) coupons redeemed in exchange for customers purchasing healthy menu items (as outlined in Table 2). Though the dietary tips were developed before publication of the 2015 USDA dietary guidelines,[22] they were highly concordant with these guidelines except for milk products. Whereas the guidelines recommend low fat milk products, our tip was to consume either low or regular fat milk products. This is consistent with the evolving literature that dietary saturated fat[24,33] may not be associated with CVD events, and with multiple observational studies suggesting full fat milk products do not increase the risk for CVD and that some full fat milk products may lower risk.[34–36] The table tents and brochure included a link to the HHL website, which provided more detailed information on dietary patterns associated with a reduced risk for CVD. Coupons were two sided, with the coupon value and suggested healthy eating options on one side, and a space for customers or restaurant staff to indicate which healthy options were selected (and the date) on the other side.

We used principles from the Socio-Ecological Model to build on individual level interventions which primed study participants to make healthier lifestyle choices in the broader restaurant environment. Constructs from social marketing informed intervention and materials development.[37] For example, the coupons involved the concept of exchange (trading off favored sweetened beverages for a lower cost meal).

The intervention was piloted over three months in fall 2013. Restaurants were asked to display a table tent on every table and make the tri-fold brochure available to patrons throughout the three month study; research staff provided replacement table tents and brochures as needed. Coupons were distributed to each of the three restaurants, HHL Lifestyle Study participants, CAC members, and several community groups to ensure a wide and diverse distribution.[37] Research staff collected the coupons received by restaurants each week, recorded the data available on each coupon, and submitted the coupons for monthly reimbursement to restaurants. Reimbursement to restaurants for redeemed coupons was provided by a local health promotion grant to the Lenoir County Cooperative Extension Center from the Kate B. Reynolds Charitable Trust. Coupons were tailored for each restaurant, and adapted slightly for the chain restaurant to comply with corporate requirements, but all restaurants were reimbursed the full cost of the coupon plus a small handling fee (as incentive to participate in the program). Coupons were valued at $2.50 - $5 depending on the restaurant. At the independent restaurants, participants received $2.50 off the price of a healthy menu item; at the chain restaurant, they received a menu item of about $5.00 in value when redeeming the coupon. Overall, twice as many coupons were distributed for the independent restaurants so that the total value of coupons was similar across all participating restaurants.

Expanded Study Recruitment

For the expanded program we again contacted all licensed restaurants in the county with a mailed invitation to take part in this study. Nine expressed interest in participating (five chain restaurants and four independent restaurants) and comprised the sample for the

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expanded study. All restaurants served lunch, with all but one serving breakfast; six of nine restaurants served dinner as well.

Expanded Study Intervention

The intervention was adapted based on lessons learned during the pilot study. The expanded program, conducted September 2014 through January 2015, was five months long, and each month restaurants received table tents with two of the ten tips to highlight during the month so that over five months, all ten tips were covered. The table tents included quick response (QR) codes for customers to easily scan and link to more information on the HHL website. These tips were coordinated with a series of monthly articles in the local newspaper that provided additional information on the two tips for the month and listed the restaurants participating in the project. The topics, and order in which they were addressed in newspaper articles included: 1) Choose Nuts and Nut Butters Often; 2) How Healthy Fats are Part of a Heart Healthy Diet; 3) The Good and the Bad about Carbs and How They Fit into a Heart Healthy Diet; 4) Eggs, Chicken, Fish, Meat, and Dairy; and 5) Making Healthy Choices when Eating Out – Including Dessert. Restaurants continued to display and disseminate the trifold brochure, and project posters (instead of window decals) were provided to each restaurant for display in the window. Coupons were similar to the pilot coupons, although the value was increased from $2.50–$5 to $3.00–$5.50 depending on the restaurant; adaptations were again made to coupons for chain restaurants to accommodate corporate requirements. To increase customer uptake of the coupons, an average of 59 coupons per month were distributed to each restaurant (restaurants using the $3.00 coupons received about twice as many as those using the $5.50 coupons) and the managers were asked to disseminate the coupons as they saw fit (instead of dissemination of coupons by the research team).

Measures for both Pilot and Expanded Studies

Restaurant managers completed pre/post intervention interviews and written surveys to assess nutrition knowledge, perceived customer attitudes and preferences regarding healthy eating, perceived healthiness of current menu options, feasibility of the intervention, and successes/limitations of program components (table tents, brochures, coupons, and website). Data were collected after research staff obtained verbal consent from the managers to participate and no identifying information was obtained. During the interviews, research staff took notes on the managers' responses; audio recording was not done. To solicit customer feedback on program components, about half way through both projects, trained research staff conducted customer intercept surveys (n=25 per restaurant) on a weekday during lunch at each of the restaurants. After reading a brief paragraph explaining the purpose of the study, customers agreed to participate by giving verbal consent. Participants were offered the choice of completing the survey on their own or to have study staff read the survey items and enter responses. Further, participants could complete the survey at their own table or at a table designated for study participants. As an incentive, participating customers were provided a program coupon to the restaurant for completing the survey. In addition, process evaluation measures were collected by trained research staff and included weekly observations of table tent and brochure availability, if the program poster was displayed, coupon counts, and coupon use information. The customer intercept surveys used

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in the pilot and expanded studies were identical, while the restaurant manager surveys were very similar.

Analysis

Percentages are used to describe study findings from the surveys and process measures. Coupon data for pilot and expanded projects are presented separately because of slight variations to the coupon content and protocol. Qualitative results, including representative quotes from the managers, are also reported.

RESULTS

Three restaurants, including two independent (one with counter service and one “sit down”) and one fast-food chain restaurant took part in the pilot study; nine restaurants, including four independent (one with counter service serving breakfast and lunch, one cafeteria style serving breakfast, lunch, and dinner, two “sit down” serving lunch and dinner) and five fast-food chain restaurants (four of the same chain) took part in the expanded project. In total, ten different restaurants participated in either the pilot or the expanded program, with two restaurants participating in both. Process assessment for the expanded project, which ran for 20 weeks, included 179 restaurant visits. Table tents on at least one table or more than 5 tables were observed during 152 (85%) and 124 (69%) of these visits, respectively. In addition, brochures were noted to be available during 110 (61%) and the intervention poster displayed during 134 (75%) of the visits.

Manager Surveys

All managers were somewhat knowledgeable about health and nutrition information prior to participation, recognizing the importance of regular fruit and vegetable consumption as well as low sodium intake, but many initially believed low fat items were inherently healthy choices. Healthfulness of menu items was perceived by managers to be less important to customers than taste, presentation, and customer service.

At follow up, all but one manager said they would be likely to participate again. Representative quotes (in italics) from the managers follow.

> “We appreciate being part of the study…”
>
> “We are thankful for the investment in Lenoir County to assist in becoming more heart healthy”
>
> “[Participating in the project] was easy!”
>
> “Great program for all of us! Let’s see if the customers change their habits [when the program is over]”

One manager went beyond the required intervention components and posted information about the program on the restaurant’s Facebook page.

Managers believed table tents were generally well-received by their customers. However, they suggested improving their durability to withstand constant handling by customers and

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simplifying content to increase customer uptake of the message. Several managers suggested less text and more images in future iterations. The brochure's appeal varied across restaurants, but one manager reported, *"I was shocked by some of the folks who picked up a brochure! [I thought they had no interest in eating healthy]."* Another manager suggested moving the brochure location from beside the cash register to customers' eye level when ordering to increase brochure uptake.

Managers liked the coupons, and reported prompt reimbursement from the project. As one commented, *"Coupons were easy – no hassle. [The research team] did the work – we just gave out coupons."* In the pilot study, there was a low (13%) redemption rate for coupons. Consequently, coupon dissemination was adapted during the expanded follow-up study, allowing managers to handle coupon distribution (offering coupons at the point of sale); the change resulted in a 39% coupon redemption rate during the expanded project (a three-fold increase over the pilot). Most managers agreed that the coupons (providing a discount for healthy foods) was the key to the project's success; one manager suggested that even $1 off would encourage his customers to make healthier choices. Notably, none reported a negative economic impact of the intervention.

Managers also reported participation in this project increased their personal nutrition knowledge, especially in regards to healthy fat consumption. As one manager commented, *"[I didn't know] that fats and oils can be heart healthy!"* Another manager reported surprise when he discovered, *"…sugar is the most dangerous food,"* and a third manager was pleasantly surprised by the number of items already on his menu that contained healthy components.

Pilot Study Coupons (Table 3)

Of 1,564 coupons distributed, 207 (13 %) were redeemed during the three month pilot: 65 (31%) at Restaurant 1, 39 (19%) at Restaurant 2, 103 (50%) at Restaurant 3. Only 13 (6%) coupons were returned unmarked (i.e., research staff were unable to determine the healthy choices the customer selected). Among the 194 (94%) coupons with marked choices, the most popular selections were low sugar beverages (in part because most coupon users chose a beverage along with an entrée item), 147 (71%), followed by an entrée with a fruit/vegetable, 66 (32%), and a salad entrée, 63 (30%). A total of 66 (32%) HHL Lifestyle study members redeemed coupons; the rest of coupons redeemed were from those distributed to the broader community.

Expanded Intervention Study Coupons (Table 3)

Of 2,650 coupons distributed, 1,037 (39%) were redeemed during the five month project (range for independent restaurants 33 to 264; range for fast food restaurants 61 to 119, with 2 months of coupon data not used because of data quality concerns). The most popular choices (Table 3) were a low sugar beverage (because most coupon users chose a beverage along with an entrée item), 550 (53%), followed by a whole grain bread, 469 (45%), and an entrée with a fruit/vegetable, 324 (31%).

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Customer Surveys (Table 4)

A total of 300 customers completed intercept surveys during lunch, usually after they had purchased their meals. Among these respondents, 268 (89%) indicated they often eat lunch at this restaurant. Of the 150 interviewed at independent restaurants, 58 (39%) reported eating at the restaurant at least once per week; of the 150 interviewed at fast food restaurants, 66 (44%) reported eating at the restaurant at least once per week. Overall, 126 (42%) of those surveyed noticed the table tents; of those who did, 115 (91%) indicated the nutrition information was helpful and 91 (72%) reported the nutrition information would influence their restaurant purchasing habits in the future. A small percentage of customers, 23 (8%), requested a copy of the healthy lifestyle brochure with 17 (74%) reporting the information was helpful.

Website

During the pilot intervention, only one person logged onto the website as a Lenoir County resident, and five logged on as residents of nearby counties. During the expanded intervention, the website averaged one new hit per day, but it is unknown how much of that traffic was due to the addition of QR codes to table tents versus other work related to the HHL Lifestyle program happening in the county.

DISCUSSION

Overall, the community-based restaurant intervention evaluated in this study was feasible, well-received by restaurant managers, and positively influenced customers to select heart healthy menu items. Project implementation was straightforward for research staff and restaurants. Both chain and independent restaurants could easily participate with minor adaptations (specifically to the structure of the coupons for chain restaurants). Given the number of restaurants that participated in the pilot and expanded follow-up study, the intervention was able to disseminate evidence-informed nutrition education messages to a wide audience in this rural community in an effort to improve heart healthy eating behaviors. Though the primary focus of this intervention was at the community level of the Socio-Ecological Model, it may also have had impact at the individual and interpersonal levels by changing knowledge and attitudes about healthy menu options for individual customers and their families, friends, or co-workers.

After participating in the intervention, managers reported greater confidence and interest in promoting healthier menu options, which is important for long-term impact of this type of intervention. The program assuaged managers' fears that promoting healthier menu options would result in lost profits, and demonstrated there is a demand among their customer base for healthier menu options. Based on the customer intercept survey, customers who read the table tents and brochure seemed open to and interested in the nutrition information provided and many indicated the information may positively influence what they order at the restaurant in the future. Also, customers made a variety of healthy choices when redeeming coupons.

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Coupon use improved greatly between pilot and expanded interventions, and this change is attributed to the managers' suggestion that restaurants handle dissemination instead of research staff. This approach facilitated direct marketing to customers already in the restaurant, but may miss potential patrons who do not regularly frequent the restaurants. In the pilot study researchers had hoped to expand the restaurants' customer base; instead the project appeared to primarily engage existing customers.

To address the very low website access rate during the pilot, a CAC member suggested including quick response (QR) codes on table tents and brochures for the expanded study to capitalize on customers' immediate interest in health information while dining by allowing them to access the website on their phone or mobile device. Website hits did increase during the expanded study, but we were unable to determine whether the increase was a direct result of the changes to the table tents.

In their recent systematic review of community-based restaurant interventions, Valdivia Espino and colleagues[19] conclude there is sufficient evidence to support the effectiveness of interventions that pair point of purchase information with an increased availability of healthy choices. Although the study did not ask restaurants to add new menu items, based on the emerging evidence about the importance of healthful fats as part of a heart healthy diet,[9,11,22] we effectively increased the availability of healthy choices by indicating that many existing menu items are heart healthy choices. Thus, a strength of this study is that the framework of the intervention was consistent with best evidence for effective restaurant interventions. Further, we are not aware of other community-based restaurant interventions with a major focus on selecting menu items that have healthful fats,[19,38–41] which are a critically important component of a heart healthy diet.[11]

This study has several limitations. It was conducted in one county so generalizability to the wider context of rural North Carolina restaurants or to other geographic or more urban settings is limited. The intervention was short (only three months for the pilot and five months for the expanded program), so the long term impacts of the intervention remain unknown. Also, our customer intercept survey was administered at lunchtime; the response to the intervention may differ at other meals, especially dinner when patrons may spend more time in the restaurant. Social desirability bias may have influenced the responses of both managers and customers to our surveys. Finally, project materials and coupon reimbursement were paid for by a grant, so long term sustainability of such a program remains unknown.

In conclusion, restaurants represent an important venue to engage the broader community in efforts to improve dietary intake to reduce CVD risk because a large percentage of Americans' food intake is purchased at restaurants. In addition, restaurants provide an opportunity to intervene at the community level of the Socio-Ecological Model, reinforcing and building on efforts to promote healthful dietary patterns addressed at more downstream (individual) levels of the model. This study employed a simple, non-disruptive approach to disseminating the latest nutrition information in community settings where individuals are primed to think about their food choices. Managers and customers both reported positive

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attitudes toward the intervention structure and educational content, and many restaurant customers made healthy choices when redeeming program coupons.

TRANSLATION TO HEALTH EDUCATION PRACTICE

As the overall framework of the intervention was well received by managers and customers and the scientific data in support of a focus on dietary fat and carbohydrate quality is robust,[9,11,22] health educators and other health professionals are encouraged to implement similar programs or modify the content of current restaurant-based programs to be consistent with that evaluated in this study. Future research should address the potential for scaling up and sustaining restaurant interventions that are of low financial and logistical burden to restaurant owners yet may begin to change the culture of eating out in a local community. Short term funding from local health or philanthropic agencies for a coupon intervention could jump start the process by helping restaurant owners see there is a demand for healthier options. A striking finding from our initial focus group with restaurant owners was that none felt their customers desired healthier menu items. However, based on post-intervention data, restaurant owners and managers developed a new appreciation of customer desire for healthy choices. Further research based on dissemination and implementation science could help identify the tipping point where both customers and restauranteurs embrace both the economic and health related value of healthier restaurant options, creating a sustainable win-win retail environment.

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References

1. American Heart Association. Heart and Stroke Statistics. http://www.heart.org/HEARTORG/General/Heart-and-Stroke-Association-Statistics_UCM_319064_SubHomePage.jsp. Updated 2016. Accessed November 15, 2014
2. Bibbins-Domingo K, Pletcher MJ, Lin F, et al. Racial differences in incident heart failure among young adults. N Engl J Med. 2009; 360:1179–1190. [PubMed: 19297571]
3. Bonow RO, Grant AO, Jacobs AK. The cardiovascular state of the union: confronting healthcare disparities. Circulation. 2005; 111:1205–1207. [PubMed: 15769758]
4. Go AS, Mozaffarian D, Roger VL, et al. Executive summary: heart disease and stroke statistics–2014 update: a report from the American Heart Association. Circulation. 2014; 129:399–410. [PubMed: 24446411]
5. Howard G, Labarthe DR, Hu J, et al. Regional differences in African Americans' high risk for stroke: the remarkable burden of stroke for Southern African Americans. Ann Epidemiol. 2007; 17:689–696. [PubMed: 17719482]

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6. McWilliams JM, Meara E, Zaslavsky AM, et al. Differences in control of cardiovascular disease and diabetes by race, ethnicity, and education: U.S. trends from 1999 to 2006 and effects of medicare coverage. Ann Intern Med. 2009; 150:505–515. [PubMed: 19380852]
7. Peterson E, Yancy CW. Eliminating racial and ethnic disparities in cardiac care. N Engl J Med. 2009; 360:1172–1174. [PubMed: 19297569]
8. Borhani NO. Changes and geographic distribution of mortality from cerebrovascular disease. Am J PUblic Helath Nationals Health. 1965; 55:673–681.
9. Mozaffarian D, Appel LJ, Van Horn L. Components of a cardioprotective diet: new insights. Circulation. 2011; 123:2870–2891. [PubMed: 21690503]
10. Artinian NT, Fletcher GF, Mozaffarian D, et al. Interventions to promote physical activity and dietary lifestyle changes for cardiovascular risk factor reduction in adults: a scientific statement from the American Heart Association. Circulation. 2010; 122:406–441. [PubMed: 20625115]
11. Estruch R, Ros E, Salas-Salvado J, et al. Primary prevention of cardiovascular disease with a Mediterranean diet. N Engl J Med. 2013; 368:1279–1290. [PubMed: 23432189]
12. Stokols D. Establishing and maintaining healthy environments: towards a social ecology of health promotion. Am Psychol. 1992; 47:6–22. [PubMed: 1539925]
13. Stokols D. Translating social ecological theory into guidelines for community health promotion. Am J Health Promot. 1996; 10:282–298. [PubMed: 10159709]
14. Fisher EB, Brownson CA, O'Toole ML, Shetty G, Anwuri VV, Glasgow RE. Ecological approaches to self-management: the case of diabetes. Am J Public Health. 2005; 95:1523–1535. [PubMed: 16051929]
15. McLeroy K, Bibeau D, Strecker A, Glanz K. An ecologic perspective on health promotion programs. Health Educ Q. 1988; 15:351–377. [PubMed: 3068205]
16. Lin, BH. Food Away from Home. http://www.ers.usda.gov/topics/food-choices-health/food-consumption-demand/food-away-from-home.aspx#.U0w1VPldVa0. Published 2014. Accessed November 15, 2014
17. Powell LM, Nguyen BT, Han E. Energy intake from restaurants: demographics and socioeconomics, 2003–2008. Am J Prev Med. 2012; 43:498–504. [PubMed: 23079172]
18. Nguyen BT, Powell LM. The impact of restaurant consumption among US adults: effects on energy and nutrient intakes. Public Health Nutr. 2014; 17:2445–2452. [PubMed: 25076113]
19. Valdivia Espino JN, Guerrero N, Rhoads N, et al. Community-based restaurant interventions to promote healthy eating: a systematic review. Prev Chronic Dis. 2015; 12:140455. doi: http://dx.doi.org/10.5888/pcd12.140455.
20. American Heart Association. Dietary guidelines for healthy American adults. A statement for physicians and health professionals by the Nutrition Committee, American Heart Association. Circulation. 1986; 74:1465A–1468A.
21. National Cholesterol Education Program. Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. The Expert Panel. Arch Intern Med. 1988; 148:36–69. [PubMed: 3422148]
22. U.S. Department of Agriculture. Dietary Guidelines for Americans 2015–2020. http://health.gov/dietaryguidelines/2015/guidelines/ Published 2015. Accessed May 22, 2016
23. Mozaffarian D, Ludwig DS. Dietary guidelines in the 21st century–a time for food. JAMA. 2010; 304:681–682. [PubMed: 20699461]
24. Siri-Tarino PW, Sun Q, Hu FB, Krauss RM. Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease. Am J Clin Nutr. 2010; 91(3):535–546. [PubMed: 20071648]
25. U.S. Department of Agriculture. Dietary Guidelines for Americans. 2010. http://www.cnpp.usda.gov/dietaryguidelines.htm Published 2011. Accessed January 20, 2014
26. Pitts SB, Vu MB, Garcia BA, et al. A community assessment to inform a multilevel intervention to reduce cardiovascular disease risk and risk disparities in a rural community. Fam Community Health. 2013; 36(2):135–146. [PubMed: 23455684]
27. Cooper LA, Ortega AN, Ammerman AS, et al. Calling for a bold new vision of health disparities intervention research. Am J Public Health. 2015; 105(Suppl 3):S374–376. [PubMed: 25905830]

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28. Halladay JR, Donahue KE, Hinderliter AL, et al. The Heart Healthy Lenoir project–an intervention to reduce disparities in hypertension control: study protocol. BMC Health Serv Res. 2013; 13:441.doi: 10.1186/1472-6963-13-441 [PubMed: 24156629]
29. Keyserling TC, Samuel-Hodge CD, Pitts SJ, et al. A community-based lifestyle and weight loss intervention promoting a Mediterranean-style diet pattern evaluated in the stroke belt of North Carolina: the Heart Healthy Lenoir Project. BMC Public Health. 2016; 16:732.doi: 10.1186/s12889-016-3370-9 [PubMed: 27495295]
30. Jilcott Pitts SB, Smith TW, Thayer LM, et al. Addressing rural health disparities through policy change in the stroke belt. J Public Health Manag Pract. 2013; 19(6):503–510. [PubMed: 23446877]
31. Kowitt S, Woods-Jaeger B, Lomas J, et al. Using Photovoice to understand barriers to and facilitators of cardiovascular health among African American adults and adolescents, North Carolina, 2011–2012. Prev Chronic Dis. 2015; 12:150062. doi: http://dx.doi.org/10.5888/pcd12.15006232.
32. Mozaffarian D, Micha R, Wallace S. Effects on coronary heart disease of increasing polyunsaturated fat in place of saturated fat: a systematic review and meta-analysis of randomized controlled trials. PLoS Med. 2010; 7:e1000252.doi: 10.1371/journal.pmed.1000252 [PubMed: 20351774]
33. Hooper L, Martin N, Abdelhamid A, Davey Smith G. Reduction in saturated fat intake for cardiovascular disease. Cochrane Database Syst Rev. 2015; (6):CD011737.doi: 10.1002/14651858.CD011737 [PubMed: 26068959]
34. Praagman J, Franco OH, Ikram MA, et al. Dairy products and the risk of stroke and coronary heart disease: the Rotterdam Study. Eur J Nutr. 2015; 54(6):981–990. [PubMed: 25296885]
35. Qin LQ, Xu JY, Han SF, Zhang ZL, Zhao YY, Szeto IM. Dairy consumption and risk of cardiovascular disease: an updated meta-analysis of prospective cohort studies. Asia Pac J Clin Nutr. 2015; 24:90–100. [PubMed: 25740747]
36. Yakoob MY, Shi P, Hu FB, et al. Circulating biomarkers of dairy fat and risk of incident stroke in U.S. men and women in 2 large prospective cohorts. Am J Clin Nutr. 2014; 100:1437–1447. [PubMed: 25411278]
37. Carins JE, Rundle-Thiele SR. Eating for the better: a social marketing review (2000–2012). Public Health Nutr. 2014; 17:1628–1639. [PubMed: 23711161]
38. Anzman-Frasca S, Mueller MP, Sliwa S, et al. Changes in children's meal orders following healthy menu modifications at a regional U.S. restaurant chain. Obesity (Silver Spring). 2015; 23(5):1055–1062. [PubMed: 25919925]
39. Lee-Kwan SH, Bleich SN, Kim H, Colantuoni E, Gittelsohn J. Environmental intervention in carryout restaurants increases sales of healthy menu items in a low-income urban setting. Am J Health Promot. 2015; 29(6):357–364. [PubMed: 24968184]
40. Lee-Kwan SH, Yong R, Bleich SN, et al. Carry-out restaurant intervention increases purchases of healthy food. J Hunger Environ Nutr. 2015; 10:456–466.
41. van Kleef E, van den Broek O, van Trijp HC. Exploiting the spur of the moment to enhance healthy consumption: verbal prompting to increase fruit choices in a self-service restaurant. Appl Psychol Health Well Being. 2015; 7(2):149–166. [PubMed: 25820268]

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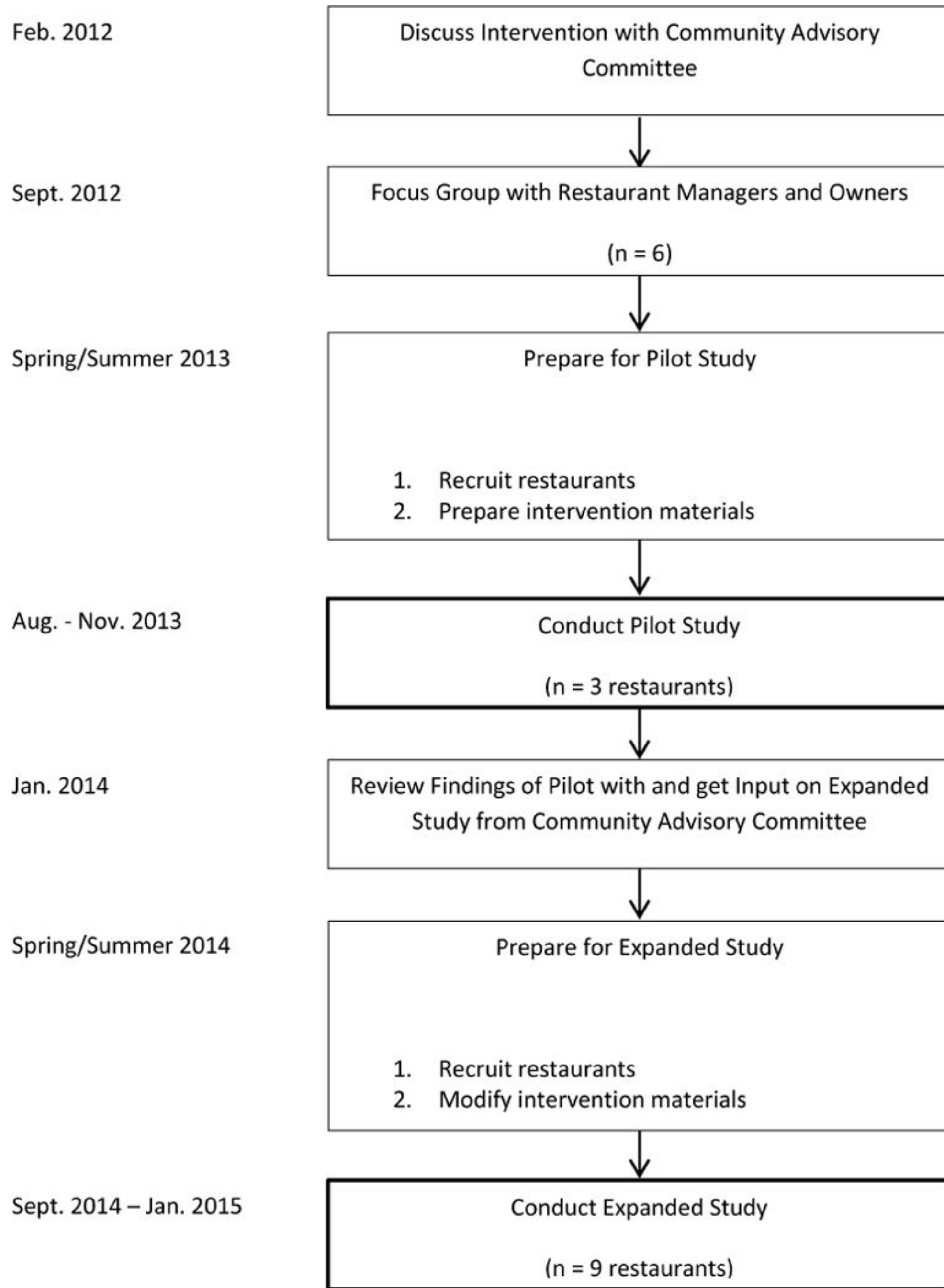

Figure 1.
Time Line for Pilot and Expanded Studies.

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TABLE 1

10 Heart Healthy Eating Tips

Heart Healthy Eating Tip	Details
1. Choose nuts and nut butters often	Eat a serving of nuts or nut butter 4–5 times each week. - Peanut and peanut butter are inexpensive and healthy - A peanut butter sandwich on whole wheat bread is a good choice for lunch or snack - Add nuts to fruit or vegetable dishes or salads - A serving of nuts is a small handful or 2 tablespoons of nut butter
2. Eat foods made with vegetable oils daily	Vegetable oils contain healthy fats. Aim for 2 to 6 servings per day (a serving is one tablespoon) - Fry, sauté, or cook with vegetable oil including canola, corn, soybean, peanut, olive, or other vegetable oils. Avoid solid shortening and stick margarine, which usually have unhealthy trans fats. - Use regular salad dressing and mayonnaise (which have healthy fats) instead of the low-fat or no-fat options, which usually contain more sugar. - For spreads, use tub margarine instead of stick margarine, which usually contains unhealthy trans fats
3. Choose drinks with less sugar	Sweet tea, sports drinks, regular sodas, and most fancy coffee drinks contain a lot of sugar (9 teaspoons per 12 ounces of soda) - Water is always a good choice. - Coffee and tea are good choices. A little milk or cream in coffee or tea is fine, but limit sugar to no more than 2–3 teaspoons per cup or glass. Half unsweetened and half sweetened tea is a good option. - 100% fruit juice is another good choice, but limit to 1 glass (8 oz) a day.
4. Choose whole grain products	- Eat whole grain bread instead of white bread whenever possible. - Eat other whole grain products like whole wheat pasta, whole grain tortillas, whole grain breakfast cereal, and brown rice.
5. Eat fruits and vegetables often	- Aim for 5 or more servings of fruits and vegetables each day. - Eat a variety of fruits and vegetables. Try to eat a "rainbow" of colors, including dark green and orange vegetables. - Eat fruit instead of drinking fruit juice.
6. Eat chicken, fish, and beans often, and limit red meat to once a day	- Try to eat fish (including tuna) at least once a week. (If pregnant or planning a pregnancy, do not eat fish with high mercury content: king mackerel, swordfish, and albacore tuna.) - Use vegetable oil to fry fish or chicken. Eating chicken skin is OK. - One serving a day of red meat or pork is fine. - Limit processed meats like bacon, sausage, cold cuts (deli meats), and hot dogs to twice a week.
7. Consume low or full fat milk or dairy products such as yogurt or cheese	- You may have heard that no-fat or low-fat dairy products are the best choices, but recent research suggests full fat dairy products do not increase risk for heart disease. - Due to high sugar content, limit dairy desserts to a couple times a week. - Butter is OK, but tub margarine made with vegetable oil is a better choice.
8. Eating 1–2 eggs a day is fine	- You may have heard that eating eggs can raise your cholesterol, but recent research suggests eating eggs does not increase the risk for heart disease.
9. Choose wisely when eating out	- Limit sugar sweetened beverages. - Enjoy a burger or sandwich as your meal, on a whole wheat bun or bread, if available. Pizza with veggies is a reasonable choice, as are most entrees at sit-down restaurants.

Heart Healthy Eating Tip	Details
	- Consider a side other than fries or potatoes, such as salad, fruit, or vegetables. - If you order fries or dessert, get a small portion or share a larger one.
10. Make smart dessert choices	- Fruit is a good choice for dessert. - Chocolate may reduce the risk of heart disease and dark chocolate may do so more than regular chocolate. Small amounts of dark chocolate (more than 50% cocoa solids), such as half to one ounce, is a good choice for dessert. - Limit cakes and cookies and dairy dessert like ice cream and frozen yogurt to a couple times a week. - Be aware of portion sizes. Consider sharing dessert.

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TABLE 2

Coupon Healthy Choice Options

Non-chain restaurants: coupon valid for $2.50 (pilot) or $3.00 (expanded) off your meal when you make TWO of the following choices for your meal
Low sugar beverage: water, milk, coffee, 100% fruit juice, unsweetened or half sweetened tea, diet soda
Entrée with nuts
Salad with regular (full fat dressing)
Entrée with vegetables or fruit
Fruit/vegetable side item
Whole grain bread or wrap
Chain Restaurant 1: Coupon valid for one of the following for free
Sandwich of choice on wheat bun with low sugar beverage
Wheat wrap with vegetables and chicken
Entrée salad
Chain Restaurant 2: Coupon valid for one of the following
One sandwich on whole grain bread with low sugar beverage and get a 2nd free
Free fruit slices with sandwich on whole grain bread
Free bottled water with entrée salad

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TABLE 3

Healthy choice selections when coupons were redeemed[*]

Option	Number of choices made	
	Pilot (n=194)[a]	**Expanded (n=1037)**
Low Sugar Beverage	147 (76%)	550 (53%)
Entrée with vegetables or fruit	66 (34%)	324 (31%)
Salad with regular (full fat dressing)	63 (33%)	260 (25%)
Whole grain bread or wrap	61 (31%)	469 (45%)
Fruit/vegetable side item	29 (15%)	251 (24%)
Entrée with nuts	11 (6%)	31 (3%)

[*]Participants could select more than one option when redeeming a coupon.

[a]207 returned coupons, but 194 had information about choices.

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TABLE 4

Response to Customer Intercept Surveys

Question	Pilot	Expanded	Combined
	N = 75	**N = 225**	**N = 300**
Do you eat at this location at least once per week?	27 (36%)	97 (43%)	124 (41%)
Did you notice the HHL table tents? (%Yes)	40 (53%)	86 (39%)	126 (42%)
If yes…	**N = 40**	**N = 86**	**N = 126**
Was the nutrition information helpful? (%Yes)	39 (98%)	76 (88%)	115 (91%)
Did the nutrition information influence what you bought at this restaurant today? (%Yes)	11 (28%)	31 (40%)	42 (33%)
Did you feel like the nutrition information…will influence what you order in this restaurant in the future? (%Yes)	28 (70%)	63 (79%)	91 (72%)
Did you ask for the HHL nutrition information brochure? (%Yes)	8 (11%)	15 (18%)	23 (18%)
*Of those who asked for the brochure…*Did you find the brochure helpful? (%Yes)	7 (88%)	16 (100%)	22 (96%)