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Use of Environmental Change Strategies to Facilitate Sodium Reduction: A Case Study in a Rural California School District

Ms Stephanie Taylor, MPH

Outcomes, Planning, and Evaluation Division, Shasta County Health and Human Services Agency, Redding, California

Mss Theresa Tibbett, MA

Healthy Communities Division, Public Health Branch, Shasta County Health and Human Services Agency, Redding, California

Ms Deesha Patel, MPH

Division for Heart Disease and Stroke Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia

Mss Ereka Bishop, MPA, RD

Healthy Communities Division, Public Health Branch, Shasta County Health and Human Services Agency, Redding, California

Abstract

Context—Excess sodium consumption increases the risk for hypertension, which is a leading risk factor for cardiovascular disease. For children and teenagers, school meals are a significant source of sodium consumption.

Objective—To describe the environmental change strategies that were implemented to reduce sodium in the school meals of a rural California school district.

Design—Descriptions of the environmental strategies, with an emphasis on staff training and infrastructure improvements.

Setting—School district of approximately two thousand 9th- to 12th-grade students in rural, northern California.

Participants—School administration and food service staff at the 5 high schools in Anderson Union High School District.

Intervention—Shasta County Public Health partnered with Anderson Union High School District to (1) facilitate changes to meal preparation practices, (2) improve cafeteria infrastructure, and (3) provide training and technical assistance to improve procurement strategies.

Correspondence: Stephanie Taylor, MPH, Shasta County Health and Human Services Agency, Redding, CA 96001 (smtaylor@co.shasta.ca.us).

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Results—Environmental strategies to reduce sodium in school meals were implemented in 2011. Anderson Union High School District has continued to successfully implement scratch cooking and improve procurement strategies to reduce sodium in school meals.

Conclusion—Using an approach that includes environmental change strategies can lead to sodium reduction in a school setting.

Keywords

environmental change; nutrition; rural school district; school meals; sodium content; sodium reduction

Long-term consumption of sodium in amounts greater than the *2010 Dietary Guidelines for Americans* recommended limit of 2300 mg per day, or 1500 mg for those in high-risk groups,¹ increases the risk for development of hypertension, which is a risk factor for coronary heart disease and stroke.¹⁻³ Although hypertension most commonly occurs in adults, sodium consumption has been positively correlated with elevated systolic blood pressure and prehypertension in children and teenagers.^{4,5} Children and teenagers in one study were shown to consume an average of 3387 mg of sodium daily.⁴

School meals can be a significant source of sodium for children who eat at school. In the Fourth School Nutrition Dietary Assessment Study conducted during the 2009-2010 academic year, breakfasts offered contained an average of 549 to 644 mg of sodium; lunches offered contained an average of 1395 to 1651 mg of sodium.⁶ Schools have begun to address sodium reduction in school meals; the Healthy Hunger-Free Kids Act of 2010 requires schools participating in the National School Lunch and School Breakfast Programs to meet incremental sodium reduction targets in 2014, 2017, and 2022.⁷ While some school districts may adopt solutions such as policy change, other approaches such as environmental change (physical or material change to the economic, social, or physical environment)⁸ can also promote healthy choices. Descriptions of environmental strategies for reducing sodium in school meals, however, are infrequent in the current literature.

Background

Shasta County is a rural county in northern California. Beginning in 2011, Shasta County Public Health (SCPH), a branch of the Shasta County Health and Human Services Agency, partnered with the Anderson Union High School District (AUHSD), to facilitate sodium reduction in school meals. AUHSD enrolls approximately two thousand 9th- to 12th-grade students at 5 school sites. The primary purpose of this article is to describe the environmental change strategies implemented by both partners that resulted in a greater emphasis on scratch cooking (cooking meals with unprocessed ingredients) at AUHSD as a way to reduce sodium in school meals.

Methods

The activities described in this article were carried out with funding support from the Centers for Disease Control and Prevention Sodium Reduction in Communities Program;

the use of these funds was limited to nonresearch activities. The director of SCPH confirmed that the activities reported here are nonresearch activities.

Planning

Two of the 5 AUHSD schools have on-site cafeterias; These 2 cafeterias are more centrally located and prepare meals for the remaining 3 schools in the district. To determine the most appropriate intervention strategies for sodium reduction, SCPH conducted a formative assessment of the 2 cafeteria operations. Both kitchen equipment and staff roles supported the “heat and serve” method used by the cafeterias. Before the Sodium Reduction in Communities Program, meals served at all AUHSD schools were prepackaged in clear plastic containers from commercially prepared products and held in either a warming cabinet or a refrigerator before being handed to students for purchase. Although most of the equipment was more than 15 years old, all of the equipment was in working order. The inventory also revealed that food service employees were in need of cutting utensils, slicers, dicers, and other supplies necessary for scratch cooking.

While still in the formative evaluation stage, SCPH conducted face-to-face key informant interviews with 6 individuals who had knowledge of the food service program at AUHSD. Interview guides were prepared for each key informant on the basis of his or her role at AUHSD and focused on what logistical changes might be needed to reduce sodium and the informants’ perceptions of the receptivity of staff to such changes. Audio from the interviews was recorded with permission of each informant, and the interviews were transcribed. Key themes that emerged were concerns about potential resistance among food service employees who were accustomed to preparing food in the same way for many years and concern about the higher cost and limited availability of lower-sodium ingredients from food distributors.

On the basis of these findings, 3 strategies were used by SCPH and AUHSD: (1) training to facilitate changes to meal preparation practices; (2) improvements to cafeteria infrastructure; and (3) training and technical assistance to improve procurement strategies. The overall goal was to incorporate these environmental strategies for sodium reduction to determine whether they could be implemented in a rural school district setting.

Implementation

Changes to meal preparation practices—To create the impetus for food service staff to reduce sodium, 3 training sessions were held. The first was a series of “Salt Shockers” presentations by SCPH employees that AUHSD food service staff from the 2 cafeteria sites attended at least once. The presentations were designed to build awareness about high sodium content in foods and illustrate that sodium is common in ordinary food staples. The presentation included a demonstration on how to read food labels and a quiz that contrasted food pairs. The quiz asked participants to identify which food contained more sodium; the unexpected answers to the quiz (eg, a cup of raisin bran cereal being higher in sodium than a cinnamon raisin English muffin) were designed to generate surprise and interest among participants.

The second training was a half-day “Building Support for Sodium Reduction” workshop held for community stakeholders, including school administration from AUHSD and other local school districts. It included an expanded “Salt Shockers” presentation, a presentation about the health effects of excess sodium consumption, and a presentation about successful strategies for reducing sodium in school meals in a Southern California school district. To illustrate the feasibility of reducing sodium, a black bean and corn pita meal with standard ingredients (810 mg of sodium) was compared with the same meal that substituted 3 lower-sodium ingredients (176 mg of sodium); this reduced sodium meal was served to the attendees for lunch.

The third presentation was a 3-day hands-on training for food service staff from the 2 cafeteria sites designed to build the skills necessary to adopt scratch cooking techniques. The training covered basic nutrition principles; food safety rules; knife handling skills; measuring skills; techniques for cooking with moist heat (eg, blanching, shocking, and steaming); techniques for cooking with dry heat (eg, sautéing, stir-frying, and roasting); baking principles; and using meat alternatives (eg, beans and tofu). Ideas for ingredient substitution to reduce sodium were shared by the trainer. A stipend was provided to food service staff to cover hours worked outside their regularly scheduled time.

Infrastructure improvements—Although 11 AUHSD food service employees (6 from one AUHSD cafeteria site, 5 from another) received training to facilitate the adoption of scratch cooking, the need to efficiently prepare and serve large volumes of scratch-cooked, lower-sodium foods required infrastructure improvements. Knives, stockpots, measuring cups, high-volume dicers (Figure 1), and a high-volume slicer were purchased for the 2 on-site cafeterias and incorporated into meal preparation. This change transformed the kitchen from a “heat and serve” operation to one that focused on incorporating fresh produce into scratch-cooked meals. The dicers were used to prepare vegetables for wraps, salsa, and salads; the slicer was used to prepare onions and tomatoes for hamburgers and sandwiches. A tilt skillet (Figure 2) was installed at each of the 2 sites, enabling staff to prepare one large batch of entrée items, including stir-fried dishes, soups, and sauces, rather than using smaller cooking pans to prepare multiple batches.

Early in the project period, AUHSD installed 2 serving tables where containers of food were kept warm by steam or cold by ice below the containers at each of the 2 cafeteria sites (Figure 3). Both schools began serving meals directly from the tables, which maintained the food at an appropriate serving temperature (hot or cold). The purpose of this change was to encourage students to individually select fresh fruit and vegetable side items that appealed to them rather than being given a side item they might not want.

Procurement strategies—Cost and availability of lower-sodium ingredients were cited during key informant interviews as a barrier to reducing sodium. Early in the grant period, SCPH examined purchase reports from the food service vendors used by AUHSD to identify products that could be replaced with lower-sodium alternatives. As discussed previously, some staff reported difficulty in purchasing lower-sodium ingredients, either because the district’s food distributors did not offer them for sale since the lower-sodium ingredients

were more expensive than standard ingredients or because they did offer them but the lower-sodium ingredients were too expensive for the district to purchase.

To address these concerns, AUHSD food service staff and administrators from the 2 schools with cafeterias were included in a “Reducing Sodium in Schools Meals” workshop for school districts participating in a northern California regional buying cooperative. The goal was to increase case commitments (the number of cases individual districts and the cooperative as a whole will commit to buy) and decrease the cost of lower-sodium products. The workshop included ideas for ingredient substitution; tips on using herbs and spices to enhance flavoring of meals; and strategies for improving cost and availability of food products through the use of the buying cooperative. A trainer shared strategies that the cooperative could use to increase buying power, leverage resources, and increase product availability. Participants discussed lower-sodium products that could be added to the cooperative’s competitive bid list (a list of products purchased through competitive bids from vendors) and were encouraged to order these products.

Results

SCPH and AUHSD began implementing the environmental strategies described in this article in 2011. At the time of this writing, AUHSD has continued to successfully implement scratch cooking and improve procurement strategies in order to reduce sodium in school meals.

Discussion

There are few prior published examples of sodium reduction in school meals to use when planning a school-based nutrition promotion program. Some childhood obesity prevention programs in middle and high schools have successfully reduced calorie and fat content. Despite these successes, many middle and high school nutritional policies do not yet address sodium content.⁹ In school districts where nutritional policy change may be difficult to achieve, environmental approaches to sodium reduction, such as the approaches presented in this article, offer feasible alternatives. In addition, the successes resulting from an environmental approach to sodium reduction may be used as an intermediate step to institutionalizing changes through a formal policy.

The extent of sodium reduction can be measured through nutritional analysis. Recognizing the importance of this, SCPH and AUHSD have conducted nutritional analysis as an evaluation measure. Preliminary results indicate that a modest amount of sodium reduction has occurred; nutritional analysis is ongoing and findings will be presented in a future article.

Conclusion

School districts throughout the country are beginning the process of implementing the sodium standards required by the Healthy Hunger-Free Kids Act of 2010. This article describes the environmental strategies used by a rural California high school district to begin the process of meeting the new standards. The experience of AUHSD demonstrates that

using approaches that incorporate staff training to change meal preparation practices, cafeteria infrastructure improvements, and changes to procurement strategies can lead to health-promoting environmental changes that hold promise to reduce sodium in school meals.

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FIGURE 1. High-Volume Dicer^a

^aDicer used by 2 cafeterias in Anderson Union High School District. The dicers are used to prepare fresh vegetables for wraps, salsa, and salads.



FIGURE 2. Tilt Skillet^a

^aTilt skillet installed in 2 cafeterias in Anderson Union High School District. The tilt skillets are used to prepare large batches of entrée items, including stir-fried dishes, soups, and stews from scratch.



FIGURE 3. Serving Table^a

^aServing table installed in 2 cafeterias in Anderson Union High School District. The serving tables are used to maintain foods at the appropriate temperature (hot or cold) and serve directly to the students.