ABSTRACT

BACKGROUND: In September 2013, a Massachusetts high school launched a nutrition program in line with 2013 United States Department of Agriculture requirements. We sought to understand attitudes of stakeholders toward the new program.

METHODS: We employed community-based participatory research methods in a qualitative evaluation of the food program at the school, where 98% of students are students of color and 86% qualify for free/reduced lunch. We conducted 4 student (N = 32), 2 parent (N = 10), 1 faculty/staff focus group (N = 14), and interviews with school leadership (N = 3).

RESULTS: A total of 10 themes emerged from focus groups and interviews, in 3 categories—impressions of the food (insufficient portion size, dislike of the taste, appreciation of the freshness, increased unhealthy food consumption outside school), impact on learning (learning what’s healthy, the program’s innovativeness, control versus choice), and concerns about stakeholder engagement (lack of student/family engagement, culturally incompatible foods). A representative comment was: “You need something to hold them from 9 to 5, because if they are hungry, McDonald’s is right there.”

CONCLUSION: Stakeholders appreciated the educational value of the program but stakeholder dissatisfaction may jeopardize its success. Action steps could include incorporating culturally appropriate recipes in the school’s menus and working with local restaurants to promote healthier offerings.

Keywords: adolescents; community-based participatory research; nutrition; qualitative; school food.


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Obesity among children and adolescents leads to adult obesity and chronic disease. Young people from low-income families and adolescents of color are particularly at risk for obesity but this situation is potentially reversible. Certain behaviors, such as eating whole grains, eating fruits and vegetables and avoiding red meat, have been linked to healthier weight and reduced incidence of chronic disease.3-5

Schools provide a unique opportunity to encourage such healthy eating behaviors in children, especially because nearly 31 million of the 55 million children in school receive food through the National School Lunch Program. In 2012, Congress passed the Healthy, Hunger-Free Kids Act, which sought to improve school food programs by increasing United States Department of Agriculture (USDA) requirements for fruits, vegetables and whole grains, and limiting calories in school food program meals (Table 1).7 Previous school food program interventions in the United States have had some success in changing eating behaviors,8,9 but persistent challenges such as compensatory consumption of unhealthy foods outside of school,10 low rates of participation in healthy school breakfast programs11 and student, parent and stakeholder knowledge and engagement barriers may have prevented success of some programs.12

A charter public school in the United States is a “publicly funded school that is typically governed by a group or organization under a legislative contract (or charter) … [that] exempts the school from...
Collaborative Community Research at Boston Children’s Hospital. The school would like to acknowledge the Henry P. Kendall Foundation for their support of the new school food program.

Dr. Chatterjee received funding support from an Institutional National Research Service Award, (T32·HP12706), the Ryoichi Sasakawa Fellowship Fund, and the Department of Population Medicine at Harvard Medical School/Harvard Pilgrim Health Care Institute. Investigators also received a grant (multiple R01s—Daffy, Gillman) from the Center for Collaborative Community Research at Boston Children’s Hospital. The school would like to acknowledge the Henry P. Kendall Foundation for their support of the new school food program.

**METHODS**

**Participants**

Codman Academy Charter Public School is a charter public school in Dorchester, Massachusetts, with 148 students in grades 9-12, 13-19 years of age, 98% of whom are students of color. The most common countries of birth of students include the United States, Haiti, the Dominican Republic, and Jamaica. About 86% of students are eligible for free or reduced-price school meals. Families with an income at or below 130% of the federal poverty level, which was $24,550 for a family of 4 in 2013-2014, qualify for free lunch, and those between 130% and 185% of the federal poverty level qualify for reduced price meals. The study took place during the 2013-2014 school year.

Investigators invited all students in grades 9-12, their families, and staff at Codman Academy Charter Public School to participate. Owing to resource constraints, however, we excluded parents who did not speak English well enough to participate in focus groups.

**Instruments**

**New school food program.** In 2013-2014, Codman Academy implemented a comprehensive food program as an integral part of the school/health center community life and consistent with the school’s philosophy of “Expeditionary Learning.”15 We provide a sample week’s breakfast, lunch, and snack menu in (Table 3).

**Community-based participatory research model.** School leadership, Codman Square Health Center Staff, and investigators at Harvard Pilgrim Health Care Institute adopted a Community-Based Participatory Research (CBPR) model for this project, with community and academic investigators fully partnered for all steps of the evaluation process (Table 4).16 Student partners included the members of the Nutrition Action Club, a group of 7 students who chose to work with the school Wellness Director to address challenges encountered in previous school food program interventions. In informal feedback, however, students at Codman Academy food program stated that they would like to work with the school Wellness Director to explore the reactions of key stakeholders—students, parents, and staff—to the new school food program.

Table 1. United States Department of Agriculture (USDA) Guidelines for Total Weekly and Daily Intake During School Breakfast and Lunch for Students in Grades 9-12, According to the 2012 Final Rule

<table>
<thead>
<tr>
<th>Weekly Amount (Daily Amount)</th>
<th>Breakfast</th>
<th>Lunch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit (cups)</td>
<td>5 (1)</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Vegetables (cups)</td>
<td>0</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Grains (oz equivalents)</td>
<td>9-10 (2)</td>
<td>10-12 (2)</td>
</tr>
<tr>
<td>Meat/Meat Alternative (oz equivalents)</td>
<td>0</td>
<td>10-12 (2)</td>
</tr>
<tr>
<td>Fluid Milk (cups)</td>
<td>5 (1)</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Daily amount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calories (min/max)</td>
<td>450–600</td>
<td>750–850</td>
</tr>
<tr>
<td>Saturated fat (% of total calories)</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>≤ 500</td>
<td>≤ 740</td>
</tr>
</tbody>
</table>

certain state or local rules and regulations.”13 Codman Academy Charter Public School, located in Dorchester, Massachusetts, is the first charter public high school in the United States to be housed in a community health center. Codman Academy has used its charter status, for example, to implement a longer school day (8:30 AM-4:30 PM) and school week (school Saturday mornings from 8:30 AM to 12:00 PM). The long-term goal of the Codman Academy/Codman Square Health Center partnership is to serve as a national model for how school/community health center partnerships can transform lives and reverse the epidemic of systemic poverty and diseases such as obesity. In September 2013, the school/health center partnership launched a pilot comprehensive nutrition program to address unhealthy eating behaviors. Several innovations in the Codman Academy pilot food program for 2013-2014, such as hiring a chef and introducing new recipes, providing breakfast and snacks during class time, and educating and involving students, parents and other stakeholders in food program reform, aimed to address challenges encountered in previous school food program interventions. In informal feedback, however, students at Codman Academy expressed concerns about the acceptability of food policies that align the food program with current USDA guidelines. In this study, we used qualitative methods to explore the

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13Teacher, (lgatison@codmanacademy.org), Codman Academy Charter Public School, 637 Washington St, Boston, MA 02124.
14Bay Area Director, (lday@codmanacademy.org), Peer Health Exchange, 637 Washington St, Boston, MA 02124.
15Clinical Professor of Family Medicine, (Robertagoldman@brown.edu), Alpert Medical School of Brown University, 222 Richmond St, Providence, RI 02903.
16Professor of Population Medicine, (matthew_gillman@harvardpilgrim.org), Harvard Medical School/Harvard Pilgrim Health Care Institute, 133 Brookline Ave, Boston, MA 02215.

Address correspondence to: Avik Chatterjee, Associate Epidemiologist, (avc031@mail.harvard.edu), Division of Global Health Equity, Brigham and Women’s Hospital, 75 Francis St, Boston, MA 02115.

Dr. Chatterjee received funding support from an Institutional National Research Service Award, (T32·HP12706), the Ryoichi Sasakawa Fellowship Fund, and the Department of Population Medicine at Harvard Medical School/Harvard Pilgrim Health Care Institute. Investigators also received a grant (multiple R01s—Daffy, Gillman) from the Center for Collaborative Community Research at Boston Children’s Hospital. The school would like to acknowledge the Henry P. Kendall Foundation for their support of the new school food program.

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to promote nutrition education to their fellow Codman students.

Training of community investigators. The Harvard Catalyst Institutional Review Board (IRB) has developed training materials for community investigators in community-based participatory research projects. The IRB at the Department of Population Medicine allowed our community investigators who had completed that training to participate in certain aspects of the study. The training covers important topics for all investigators to understand when conducting human subjects research. We trained 5 high school students and a teacher using the catalyst materials. Students helped to design focus group questions, helped with focus group logistics and presented findings to other students and teachers. The teacher helped with recruitment by distributing and collecting consent forms. Additional research team members completed standard human subject research training as set forth by the IRB.

Focus groups and key informant interviews. We conducted 4 student focus groups (1 per grade), 2 parent focus groups, 1 faculty/staff focus group, and key informant interviews with the school Wellness Director, the school’s executive director, and the school chef.

During morning “crew” (homeroom classes), we described the study and handed students invitation forms. Students and teachers were able to ask questions and express concerns. There were a total of 250 students (total enrollment is 320 students) and 50 teachers and staff members present at our first focus group meeting. We found that students were interested and expressed enthusiasm about learning more about nutrition and health. The teachers were interested in additional nutrition and education materials we could provide and they were willing to help recruit students for future focus groups. These meetings were well attended and we gained skills for future research work.

### Table 2. Elements of the 2013-2014 Codman Academy School Food Program

<table>
<thead>
<tr>
<th>Policies</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junk Food Free Zone</td>
<td>A new, commercial kitchen and dining room where breakfast, lunch and snacks were prepared 6 days per week to all students at the school. Breakfast served in the classroom during first period, and snacks are served in the classroom and other in-school venues (gym, library).</td>
</tr>
<tr>
<td>New Recipes That Complied With and Frequently Exceed USDA School Food Guidelines and NUTRIKIDS Standards</td>
<td></td>
</tr>
<tr>
<td>All Meals and Snacks Were Free to all Students, Whether Eligible for Governmental Subsidies or Not</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3. March 2015 Codman Academy Charter Public School Breakfast, Lunch, and Snack Menu

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>Cereal (0.88 oz) or cereal bar (1.2 oz)</td>
<td>Bagel (2 oz) or string cheese (1 oz)</td>
<td>Cereal (0.88 oz) or cereal bar (1.2 oz)</td>
<td>Bagel (2 oz) or string cheese (1 oz)</td>
</tr>
<tr>
<td>Lunch</td>
<td>Pasta (1 c)</td>
<td>Chicken caesar (2 oz) on whole wheat wrap (2.2 oz)</td>
<td>Turkey sloppy joe (2 oz) on whole grain roll (2 oz)</td>
<td>Soft whole wheat taco (2.2 oz) with chicken (2 oz)</td>
</tr>
<tr>
<td>Dinner</td>
<td>Graham crackers (2)</td>
<td>Cereal bar (2.4 oz)</td>
<td>String cheese (1 oz)</td>
<td>Graham crackers (2)</td>
</tr>
</tbody>
</table>

Note: Fresh fruit (1 cup) and milk (8 oz. fat free or 1%) are served at breakfast and lunch, and water is available at every meal.

### Table 4. Principles of Community-Based Participatory Research (CBPR)

<table>
<thead>
<tr>
<th>Principle</th>
<th>How Our Team Addressed It</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBPR recognizes community as a unit of identity.</td>
<td>We were careful to include all parts of the Codman Academy community—students, families, staff, and administrators—in all parts of study design.</td>
</tr>
<tr>
<td>CBPR builds on strengths and resources within the community.</td>
<td>We hired an alumna of Codman Academy as our research assistant after a search we conducted through school faculty and the parent council.</td>
</tr>
<tr>
<td>CBPR facilitate collaborative, equitable partnerships in all research phases and involves an empowering and power-sharing process that attends to social inequalities.</td>
<td>School staff, leadership and students generated the idea for the new school food program and evaluation, and helped with recruitment, data collection, analysis and dissemination of results.</td>
</tr>
<tr>
<td>CBPR promotes co-learning and capacity building among all partners.</td>
<td>Our research assistant and student co-investigators participated in human subject research training and gained skills for future research work.</td>
</tr>
<tr>
<td>CBPR integrates and achieves a balance between research and action for the benefit of all partners.</td>
<td>A major purpose of the study is to further improve the food program at Codman and other schools. We presented qualitative results to students, parents, teachers and staff at a community meeting involving all stakeholders at Codman.</td>
</tr>
</tbody>
</table>

CBPR recognizes community as a unit of identity.
CBPR builds on strengths and resources within the community.
CBPR facilitate collaborative, equitable partnerships in all research phases and involves an empowering and power-sharing process that attends to social inequalities.
CBPR promotes co-learning and capacity building among all partners.
CBPR integrates and achieves a balance between research and action for the benefit of all partners.
letters with parent consent forms. The consent forms had a section for students to sign indicating assent to participate in the study. We had a goal of 8 participants per grade, with purposeful selection aimed at recruiting an even number of male and female participants from submitted consent forms. Students were accepted on a first-come first-served basis. We held all focus groups at school, with 2 student focus groups during a school Wellness day, and the other 2 on subsequent school days after school. Dr. Chatterjee led 2 student focus groups and Dr. Daftary led 2 student focus groups. After the focus groups, each participant received a gift certificate redeemable for a ticket to a local movie theater.

We partnered with the school’s parent council to distribute study invitations and consent forms at a regularly scheduled monthly parents meeting. We held focus groups at school, provided dinner beforehand, and made childcare available to parents bringing children. Dr. Chatterjee led one parent focus group and Dr. Daftary led the other. At the end of the focus groups, we gave each parent participant a $10 gift certificate to a department store.

A research team member placed invitations and consent forms in faculty and staff mailboxes. We recruited for 1 focus group of 8 faculty and staff participants that took place during a professional development day at Codman Academy. We served participants lunch prior to the start of the focus groups. Dr. Chatterjee led the staff focus group discussion. At the end of the staff focus group, participants received a $10 gift certificate to a department store.

We addressed recruitment letters to key informants—the school Wellness Director, the principal, a school board member, and the 2 food service staff—on-site and invited them to participate. Dr. Chatterjee conducted 1 key informant interview and Dr. Daftary the other 2. At the end of the interviews, participants received $10 gift certificates to a department store.

We audio-recorded all focus groups and interviews, and transcribed the recordings verbatim. Dr. Chatterjee and Dr. Daftary read the transcripts individually, using the immersion-crystallization method to identify themes from the transcripts. As Borkan describes, immersion/crystallization “consists of cycles whereby the analyst immerses him or herself into the text, emerging after concerned reflection with intuitive crystallizations, until reportable interpretations are reached.” We met repeatedly in-person to discuss the data and share ideas on emerging themes, and to resolve discrepancies. Dr. Chatterjee then grouped emerging themes into larger categories based on similarities, in an ad hoc fashion.

In keeping with the CBPR tenet that all research be associated with action, in August, 2014, we met with school administration and staff leaders to present the findings from the focus group discussions and interviews, and to discuss changes to the school food program that might come from our findings.

RESULTS

We conducted 4 student focus groups (1 per grades 9-12, N=32 participants), 2 parent focus groups (N=10), 1 faculty/staff focus group (N=14), and interviews with school leadership (N=3). Ten themes emerged from the focus group discussions and key informant interviews, in 3 major categories—impressions of the food itself, thoughts about the impact of the school food program on student learning, and concerns about stakeholder engagement.

Category 1: The Food

Portion size. “When I leave here, I leave hungry.” Almost every student and parent stated that portions were too small. Students expressed feeling hungry throughout the day, even after lunch, and felt that uniform portion size across age, sex, and body size did not address the variety in student needs for food. Parents repeatedly mentioned that students frequently described feeling hungry during the school day, and were very hungry after arriving at home as well. Teachers and staff echoed that portion sizes did not seem to meet the variety in needs of the students, based on size and activity level, but acknowledged that USDA requirements limited the amount of food available for students at each meal. Staff described noticing students sharing food, with hungrier students asking less hungry students for their leftover food, such that it seemed that overall food waste was very low.

Taste. “Can’t we just have some sázón?” Across student and parent focus groups, a frequent concern was that food did not taste good—specifically, that food did not have enough salt, enough spice and seasoning, and did not match the taste of food from home. Students expressed the desire for more variety in the menu, and more choices on any given day. Both students and parents felt that students should be able to add their own seasoning to food. In contrast, staff felt that taste had improved this year compared with prior years with the addition of an onsite school chef.

Alternate food sources. “You need something to hold them from 9 to 5, because if they are hungry, McDonald’s is right there.” Numerous students and parents noted that inadequate portion size and dislike of the taste of school food was encouraging eating behaviors that students and parents themselves did not feel good about or expect. Students noted eating much more at home after school, and stopping at the
McDonald’s across from the school both before school for breakfast, as well as after school. Parents described discouraging students from eating fast food, and mentioned recommending healthier alternatives (Subway rather than McDonald’s) but noted that because their children were hungry and had some money, and because McDonald’s was next-door, they knew their children would eat there. Teachers and staff mentioned their concerns that the food environment in the neighborhood—lots of fast food and corner stores, and not many places where healthy foods are available—made healthy eating outside of school very difficult for students who are hungry outside of school.

**Freshness.** “Healthy food is fresh food.” Students, parents, and staff all appreciated the freshness of the food. Students especially noted enjoying the salad bar, but also noted that the fresh aspect was missing from the school breakfast, which often included packaged yogurt, bagels, or other previously prepared food. Staff noted that they themselves were more likely to eat lunch in the school cafeteria because of the freshly prepared food.

**Student Learning About Food**

*Source of learning.* “Our kids [now] know what is healthy and what isn’t healthy.” Students and staff both articulated that the new school food program is getting students to think about and talk about healthy eating in ways that they did not before. Students appreciate when teachers describe why certain foods are unhealthy when enforcing the prohibition on bringing certain unhealthy foods into school as part of the junk food free policy (Table 2). Teachers and staff felt that it was a major accomplishment that students could articulate a lot of issues about food and healthy eating that they could not previously. Also, when asked to describe healthy eating, students, parents, and staff all converged on similar descriptions, reflecting a shared understanding of what healthy eating is, possibly because of the education that is part of the new school food program.

*Innovation.* “[The new school food program] helped me to think critically… kudos to the school.” Both students and teachers acknowledged that the new school food program was innovative, and acknowledged the pride, but also the challenges of being an early adopter of new policies. A staff member who is an alum of Codman Academy expressed particular pride in the school food program, and noted that his classmates had felt the same way. Staff members also described the growing pains that came with innovation. As described in other themes, the major challenges that students, staff and parents described revolved around matching student and family desires and expectations to new policies.

**Control versus choice.** “At the end of the day, you can’t really force anyone to eat [healthy foods].” Particularly in the staff focus group, the tension between control and informed choice emerged. Several staff members articulated that given an unhealthy food environment outside of the school, that ensuring only healthy options at school was very important. Others disagreed, stating that the school could teach what foods are healthy and what foods are not, but allow students the choice to eat what foods they want. These staff members cited the fact that once they graduate, students might have difficulty with the array of choices offered to them in college and elsewhere. Parents echoed the concern that high school students might not yet be able to make the healthiest choices on their own. Whereas there were different ideas on the exact role of the school in promoting healthy eating, all stakeholders felt that it was appropriate for schools to provide at least some guidance and teaching on the subject.

**Stakeholder Engagement**

*Student engagement.* “I loved Saturday cooking class. I want to do more.” Students enjoyed the parts of the school food program where they were the most engaged. They appreciated the opportunities to make food themselves, and understood the limitations of USDA guidelines better when they helped with food preparation. Despite opportunities through Saturday cooking classes and the Nutrition Action Club at Codman, students almost universally expressed a sense of not feeling involved in the decisions about food that impacted them daily, and wanted more involvement.

*Family Engagement.* “There’s school breakfast?” From the focus groups, it was clear that parents did not feel engaged in the school food program. They were not aware of many of the components of the program, including the in-school breakfast program and the afternoon snack program. Staff additionally felt that family engagement was necessary to improve eating outside of the school environment. Whereas staff members wondered if it might be difficult to tell parents what to cook, all parents articulated an understanding of healthy eating that coincided with student and staff descriptions of healthy eating. Parents and students both felt that parents would be eager to be more involved in the school food program, and came up with ideas such as families contributing recipes, parents cooking alongside the school chef, and potluck dinners for families to share healthy foods from their cultures.

*Cultural representation.* “All the vegetables together with meat, [we Haitians] call it ‘legume,’ and she loves that. That is a good food for them.” Related to the themes of lack of parent involvement and concerns about taste and portion size was the concern that
foods at the school did not reflect the cultures of families at the school. Parents described that many families at the school are from several Caribbean cultures—Haitian, Jamaican, Puerto Rican—and feel that the food at the school is not as satisfying as food cooked at home, due to different flavorings and portion size. Specifically, families noted cooking the same, healthy, foods—broccoli or baked chicken, for example—at home in a way that was more satisfying to children than what is prepared at school. Parents liked the idea of having different culturally themed weeks for lunch at school, and were excited at that as an opportunity for their children to learn about other cultures. Student comments also reflected the desire for food that better reflects their cultural background, as suggested in comments such as “can’t we just have some sazón” (sazón being a seasoning used in Latin American cuisine).

**DISCUSSION**

The 3 most prominent themes that emerged from the focus group discussions were that students feel that they are not getting enough food, students do not like the taste of the food, and that students and parents do not feel engaged in the school food decision-making process. Previous qualitative studies have shown that taste is a significant challenge in school making process. Previous qualitative studies have showed that taste is a significant challenge in school food programs, but this is the first qualitative study that exposes stakeholder perceptions of taste, portion size, and engagement since new USDA guidelines went into effect in 2013.

Studies of school food programs, qualitative or otherwise, after the new USDA guidelines are few, so it is difficult to determine how our findings fit within the greater context of the literature. Cohen et al measured fruit and vegetable consumption and quantities of food waste generated in 4 urban, low-income schools before and after the implementation of new USDA guidelines. They found that fruit and vegetable consumption increased, and the amount of food wasted was similar. In our focus groups, students reported that small portion sizes left them hungry; whereas we did not ask explicitly, students suggested that they ate everything on their plate (the required fruits and vegetables included) and were still hungry. In her interview, the school chef described low amounts of waste produced in the cafeteria, which she took to mean that students were eating everything on their plates, including fruits and vegetables.

In a survey of school administration and food service staff after the new USDA guidelines went into place, 56.4% of respondents felt that students complained initially but 70% agreed that students ultimately liked the new school lunches. That study did not include responses from students. In our study, teachers had more positive perceptions of the school food program (appreciating the freshness of the food and the innovative nature of the program) than did students and parents, which could be consistent with, and encapsulate the limitations of, a survey of just school administrators and food service staff.

Engaging stakeholders, at both the school and community level, seems crucial to improving nutrition in young people. Indeed, in a qualitative evaluation of a healthy school food program in Los Angeles schools, investigators found parent and student knowledge of and engagement in a healthy school food program important for its success. Engaging students has also been shown to improve specific nutrition-related behaviors in schools. A student-designed, student-led initiative to decrease soda consumption in 2 high schools in rural Appalachia resulted in 1 fewer serving of soda consumed per day.

To address the challenges that our findings revealed, school leadership could consider 3 types of actions—near-term, straightforward changes to improve taste, and stakeholder engagement; larger school food program changes to address stakeholder concerns; and advocacy activities to address larger regulatory and environment issues.

**Near-Term Fixes**

One change that school leadership could implement quickly to address taste and to improve cultural appropriateness and a sense of student engagement would be to offer students the freedom to choose additional seasonings to their food in the form of a seasoning bar. Administration expressed concerns about exceeding the USDA sodium requirement if seasonings contained salt, and about the cost of additional seasonings, which students tend to go through in large quantities. Salt-free seasonings bought in large quantities could obviate those concerns. Responding to the desire for more spicy foods, the school now provides red pepper flakes as part of the seasoning bar. The school also offers fresh herbs including basil and oregano, which are allowable under USDA guidelines, although students did not expressly mention fresh herbs as part of the focus group decisions. Because of the high sodium content, the school was not able to add sazón to the seasoning bar.

Additional ideas included family potluck meals featuring healthy foods from different cultures, and ways for parents to contribute healthy recipes. School food service staff could assess what recipes could be added to the school menu. Another area for change identified by staff during the focus group was to educate all students and families about the USDA requirements, which strictly limit portion size and sodium content.

Another change that the school is already pursuing is to add healthy à la carte items to lunch offerings.
School and health center staff could purchase additional items, the money from which would help support other parts of the school food program—such as the seasoning bar for students—financially.

**Larger, Long-Term Changes to the School Food Program**

The USDA guidelines provide significant barriers to addressing the 3 major areas of concern that emerged from the focus group—food, learning, and stakeholder engagement. Two additional potential long-term changes to the school food program could include larger, structural changes to the school food program at Codman.

- The extended school day at Codman Academy makes the school eligible to provide an additional meal. The additional calories from this meal might help with satiety, and the extra income to the school from the federal government may allow more flexibility in taste and choice. But adding a new meal would require significant planning and additional staff resources.
- Presenting to donors that the USDA guidelines are so restrictive that students’ energy needs are not being met may provide the school an opportunity to raise funds to try to remove their dependency on federal money from the USDA school food program. Some affluent school districts have already declined to participate in the school food program due to its restrictions, and the school could use this study’s findings to approach donors and ask for funds that would allow Codman Academy to do the same.

We discovered significant tension between USDA requirements for sodium intake (740 mg per lunch) and student and family concerns about food taste, culturally appropriate seasonings, and stakeholder engagement. Getting around strict guidelines may significantly improve acceptability of the healthy school food program. In a recent study, adolescent sodium intake was indeed associated with higher systolic blood pressure, but the magnitude of the association was small—a 1 mg increase in systolic blood pressure for every 1000 mg increase in sodium intake. Thus, being able to circumvent USDA sodium requirements by even a small amount may significantly improve satisfaction with the healthy school food program while minimally impacting student health.

**Advocacy**

In keeping with the school's “expeditionary learning” approach to education, administration raised the possibility of enlisting students, through the school’s student Nutrition Action Club or otherwise, to advocate at the local, state, and federal level for changes to school food policies. In other settings, students and parents have advocated effectively to change major school policies such as school start time.

One potential target for lobbying would be the neighborhood development corporation, to push for removal of fast food restaurants near the school. Proximity of schools to fast food restaurants increases the risk of overweight and obesity in adolescents, and students and parents themselves reported in the focus group that students frequently eat at the fast food restaurants near the school.

Another approach, used by investigators in the Shape Up Somerville study, which reduced body mass index in children in the nearby town of Somerville, would be to partner with area restaurants to promote healthy offerings and healthy menus for children and families. Such partnerships might help promote healthy eating while maintaining relationships with businesses that are important to the local economy. In addition, because the school and health center have a relationship with the neighborhood development corporation, there is the possibility for the school to advocate for recruitment of retail tenants who will offer healthy choices for children and families.

An additional advocacy goal might be to relax USDA guidelines, to give schools the flexibility to match nutritional needs with individual student needs, though such a strategy would likely not be in the health interests of children in US schools in the long run.

**Limitations**

A major limitation of this study is that we were unable to conduct parent focus groups in non-English languages. This study also did not include a quantitative assessment of what students ate.

**Conclusions**

At this small public high school, in a low-income area in Dorchester, Massachusetts, a new school food program that aligns with new USDA guidelines, whereas spurring student learning and receiving recognition for innovation, presents significant challenges to student satiety—leading to undesirable eating behaviors outside of school—and poor stakeholder involvement. These surprising findings suggest that further exploration of exactly what students are eating, both during and outside of school, would be helpful. In addition, the research team looks forward to partnering with the school and attached health center to pursue short- and long-term changes to the school food program, and to advocate for local, state, and federal policy changes that might improve the food environment for students in Dorchester.

**IMPLICATIONS FOR SCHOOL HEALTH**

As schools across the country work to implement USDA guidelines and combat childhood obesity,
lessons from Codman Academy’s experience may prove helpful.

- Partnering with students and families to develop key components of the school food program, including recipes, could increase engagement in the school food program.
- Working to improve cultural relevance of school foods may enhance participation and student and family engagement in the school food program.
- Engaging local small businesses, community organizations and even local government may help improve the overall food environment for students.

Human Subjects Approval Statement

The IRB of Harvard Pilgrim Health Care Institute reviewed and approved the study.

REFERENCES