

# A Culturally Appropriate School Wellness Initiative: Results of a 2-Year Pilot Intervention in 2 Jewish Schools

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MAUREEN R. BENJAMINS, PhD<sup>a</sup>  
STEVEN WHITMAN, PhD<sup>b</sup>

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## ABSTRACT

**BACKGROUND:** Despite the growing number of school-based interventions designed to reduce childhood obesity or otherwise promote health, no models or materials were found for Jewish schools. The current study describes an effort within a Jewish school system in Chicago to create, implement, and evaluate a school-based intervention tailored to the unique characteristics of Jewish religion, culture, and school structures.

**METHODS:** Two schools (with approximately 600 students) were selected for the 2-year pilot study. The schools were required to form a wellness council, write a wellness policy, and implement policy changes or activities in 5 target areas (health education, physical education, school environment, family involvement, and staff wellness). Objectives were measured using pre- and postintervention surveys for students, as well as the School Health Index and other tools.

**RESULTS:** Findings showed several significant increases in student knowledge, as well as an increase in the percentage of older students regularly meeting physical activity guidelines. Few changes in attitudes, other behaviors, or environmental factors were seen.

**CONCLUSIONS:** Due to a strong partnership between researchers, schools, and community organizations, meaningful changes were made within the pilot schools. These changes were reflected in a limited number of improvements in student knowledge and activity levels. Future work is needed to determine how to bring about behavioral changes, how to increase the sustainability of all of the changes, and how to disseminate the model and products of this intervention to other day schools.

**Keywords:** obesity; school wellness; religion; culture; health education.

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<sup>a</sup>Senior Epidemiologist, (benmau@sinai.org), Sinai Urban Health Institute, Mt. Sinai Hospital, Room K443, Chicago, IL 60608.

<sup>b</sup>Director, (whist@sinai.org), Sinai Urban Health Institute, Mt. Sinai Hospital, Room K437, 1500 S. California Avenue, Chicago, IL 60608.

Address correspondence to: Maureen R. Benjamins, Senior Epidemiologist, (benmau@sinai.org), Sinai Urban Health Institute, Mount Sinai Hospital, Room K443, Chicago, IL 60608.

The childhood obesity epidemic and its possible determinants and solutions are regularly discussed by both the popular media and academic outlets. The alarming statistics have motivated large numbers of communities, schools, and other organizations to implement new programs and policies designed to either prevent or “treat” the problem. School-based programs have been particularly prevalent due to the logical benefits of having a captive audience within organizations that are already responsible for educating and feeding children. Although many studies have documented effective programs in terms of limiting sedentary behaviors or increasing health knowledge, most fail to document long-term reductions in levels of obesity or behavior changes.<sup>1</sup>

One important predictor of program success is how well the interventions and policies are *tailored* to meet the needs of the individual schools.<sup>2,3</sup> Obviously, this is most challenging for schools that serve minority populations. Although many culturally appropriate health interventions have been created for African American,<sup>4,5</sup> Hispanic,<sup>5,6</sup> Native American,<sup>7,8</sup> and other racial and ethnic subgroups, no previous studies that focused on addressing childhood obesity among members of Orthodox Judaism, or any other Jewish group, were found. Although students at Jewish day schools make up less than 1% of the total number of enrolled children in the United States,<sup>9</sup> this represents over 200,000 students in approximately 750 schools across the country. Moreover, this number continues to rise.<sup>10</sup> An effort is currently under way within the Jewish community of Chicago to create a culturally appropriate school-based intervention to fill the existing void in this area.

Interventions developed for public schools may not be appropriate or effective in a Jewish school system because there are specific dietary, behavioral, and belief systems that differentiate Jewish individuals from other populations. This is particularly true for Orthodox Jews, who are the focus of the current study. For example, Jews who keep kosher are not allowed to eat pork, shellfish, or dairy and meat at the same meal. As an example of behavioral differences, observant Jews must follow modesty guidelines (Tzniut) that govern their speech, interpersonal conduct, and mode of dressing. For example, Orthodox women must wear skirts that fall below the knee (no pants or shorts) and their shirts must cover their collarbone and elbows. These rules must be followed at all times, even when exercising. Furthermore, observant women are restricted from swimming, biking, hiking, or jogging in public. These are just a few examples of the many guidelines that distinguish observant Jews from other individuals. However, even among Orthodox Jews, rules and norms often vary by community, family, or individual.

The culturally appropriate intervention described here was conceived in response to a population-based community health survey conducted in the most densely populated Jewish community in Chicago.<sup>11,12</sup> Community members and researchers were surprised to find levels of obesity that were even higher than the general population. Specifically, 28% of Jewish children in this community were found to be overweight and an additional 26% were obese.<sup>11</sup> Even more disturbingly, over one-third of the girls and over one-third of children 2-5 years of age were obese. Because the majority of individuals in this community were Orthodox and because most Orthodox children are sent to religious schools (called day schools), these schools were selected for the intervention.

However, numerous relatively unique characteristics of Orthodox day schools make addressing childhood obesity a difficult prospect. The most obvious problem is the lack of culturally appropriate health materials. Perhaps due to difficulties finding acceptable materials, the pilot schools (and most other schools in the school system) had no existing health education curriculum. In addition, day schools generally teach a dual curriculum with both secular and religious studies. Thus, the shortage of time for health education that public schools face is multiplied because health classes must fit into one-half of the day, along with all other secular topics including math, science, English, and social studies.

Several other school-related factors also inhibit efforts in this area. Specifically, most of the schools do not have federally funded meal programs and, as such, are not required to follow the recently established policies requiring schools to have a wellness policy and a wellness council. In addition, the pilot schools belong to a network of schools, not a formal school district. This means that policies have to be made by each school instead of by a district superintendent, so no single mandate to include health curriculum, for example, can be declared. Finally, one cultural factor that plays a role in any programming or educational efforts is that Orthodox families are unusually large. For example, the student surveys found that students had 6.4 siblings, on average. This is in contrast to the average American household with children, which includes just under 2 children.<sup>13</sup> Correspondingly, the families within this school community are on limited budgets, and the parents have greatly restricted amounts of time to attend meetings or educational events, or even to read materials sent home.

These structural and cultural differences must be addressed if improvements in diet and physical activity levels are to be achieved in this high-risk population. The purpose of this Jewish day school wellness initiative was 3-fold. First, a culturally sensitive wellness program was developed. Second, the model was implemented in 2 pilot schools.

Finally, the effectiveness of this program was assessed using multiple evaluation techniques, including health surveys that assessed knowledge, attitudes, and behaviors, and a schoolwide assessment of policies and practices related to health. This study describes the process used to create and implement the culturally appropriate wellness program and presents a summary of the results of the process and outcome evaluations. A brief discussion of the current progress of this initiative and future plans is also included.

## METHODS

### Subjects

This intervention was created to address the high levels of childhood obesity uncovered by a community health survey of the most densely populated Jewish community in Chicago in late 2003.<sup>11,12</sup> The results of the survey were presented to a meeting of the principals of schools in the largest network of Jewish day schools in Chicago. After the childhood obesity findings were shown, all principals present expressed interest in being a part of the pilot project. Two schools were chosen based on their location within the originally surveyed community, perceived levels of need with regards to both student and school resources, and eagerness to participate. The selected schools are technically 1 school, with separate campuses by gender, and share an executive director and a parent body, among other things. All students in grades 1-8 in the 2 pilot schools were included in the intervention activities (n = 581 at baseline).

### Intervention Design

The intervention was developed and supervised by a steering committee comprised of members of the local Jewish Federation, the Sinai Urban Health Institute, and the Associated Talmud Torahs, the umbrella organization for Jewish day schools in Chicago. The project was funded primarily by 2 local foundations. The project was implemented by a team that included an epidemiologist project director, a dietitian, a mental health consultant, a social worker from the school system, and a joint school wellness council. The pilot program took place from September 2006 to June 2008.

The intervention itself was based on the Coordinated School Health Program model developed by the Centers for Disease Control and Prevention.<sup>14</sup> Primary focus was placed on 5 of the original 8 components: health education, physical education (PE), school environment, family involvement, and staff wellness. The remaining components (health services, nutrition services, and counseling, psychological, and social services) were deemed to be less relevant to these schools due to their lack of formal positions or programming

in these areas. However, throughout the course of the intervention, these remaining areas were addressed to varying degrees.

During the first year of the 2-year pilot, project staff developed or adapted health materials to make them culturally acceptable. This included reviewing entire health curriculum guides and adapting each lesson to remove all mention of non-kosher foods, television viewing, and other topics deemed inappropriate or irrelevant by the school administrators. During this first year, the intervention required the pilot schools to undertake 3 important preliminary tasks: (1) to form a school wellness committee, (2) to complete the School Health Index (SHI), and (3) to write a school wellness policy. Specific projects and curriculum changes then had to be undertaken in each of the project's focus areas. For all areas, schools were given resources, ideas, and guidance, but decisions on what changes to implement were left up to the wellness council and school administration. The 1 exception was the health curriculum, for which both schools were instructed to implement at least 2 lessons per month in all grades. A description and examples from each area are provided here.

**Health Education.** Administrators were given the choice between numerous health curricula selected by the researchers on the basis of ease of implementation, scope, and documented success in improving knowledge and behaviors in other schools. The pilot schools selected CATCH<sup>15</sup> for grades 1-3, Eat Well and Keep Moving<sup>16</sup> for grades 4-5, and Planet Health<sup>17</sup> for grades 6-8. All relevant staff received a brief orientation to the health curriculum selected for their grade. Teachers were instructed to teach at least 2 health lessons each month and to complete a detailed log provided by the research team. The dietitian was available to teach 1 "sample" lesson per class per year. Schools were also required to implement at least one other change within this area, such as creating a health section in the library, posting nutrition information in the cafeteria, or adding health-related field trips.

**Physical Education.** A grant of \$10,000 per year was provided to each school to implement or improve PE tailored to their own needs. One school used the funds to purchase bicycles, basketball goals, and other sports equipment, as well as to fund numerous activity-based field trips and after-school activities. The other school used a majority of the money to bus students to the local Jewish Community Center (JCC) for swimming lessons during their normal PE time period, as well as to purchase a wide variety of equipment. Due to modesty requirements and guidelines on keeping genders separate, many Orthodox girls never have an opportunity to learn how to swim. The JCC provided a unique chance because they could make their pool totally private for the girls and staff it with all female teachers and lifeguards.

**School Environment.** To provide a supportive environment and to be consistent with the messages being taught through health and PE, the schools were expected to make changes to policies and structures related to health. Although ideal goals such as providing ample opportunities for physical activity, limiting exposure to unhealthy foods such as soda and candy, and prohibiting the use of foods as rewards are well known, the schools repeatedly professed the need to take “baby steps” while working toward those goals. For instance, both schools removed the soda vending machines, but neither made policies regarding the use of food as rewards. Numerous other changes were also made. As one example, the hot lunch program (which provides lunches 2 days a week) consulted with the project dietitian to make healthy changes to their lunches. A new milk program was also started for both schools to allow students to purchase skim milk during lunch. Previously no beverages were available for purchase. As a final illustration, one of the schools used grant funds to run a fruit of the week program that purchased fresh fruit each Thursday for all students.

**Family Involvement.** The involvement of parents and other family members was an important component of this initiative. To begin, parents were an integral part of the wellness council and thus were able to steer project selection and help with implementation. All parents were invited to every council meeting through the school newsletter. In addition, many activities focused on increasing parental knowledge concerning nutrition, physical activity, and eating disorders. For example, the dietitian provided information at school events (such as orientation or parent-teacher conferences) either through short “classes” or by having a table with healthy snacks, handouts, the new health textbooks, and other information. A social worker from the community was invited to speak on issues related to body image and eating disorders. A weekly article regarding health was written by a teacher and included in the school newsletter for parents. Finally, private consultations with the project dietitian were offered to parents and approximately 20 parents took advantage of this. Due to the large number of children per family in this population, this relatively small number of consultations could be expected to impact many students.

**Staff Wellness.** Premised on the fact that teachers are important role models, a variety of health promotion seminars and activities were offered for school staff. Each school had a designated amount of the project dietitian’s time to provide whatever education or training they deemed most important. For example, the dietitian spoke on general nutrition at staff meetings and private dietary consultations were also offered. Staff were also invited to all educational sessions and activities offered to parents. Some of the other changes that the schools made included starting a

bulletin board in the staff lounge where staff members take turns posting healthy recipes and increasing the nutritional content of foods purchased for the staff lounge and meetings.

**Mental Health.** In addition to the other health education offerings, a special focus on mental health was added midway through the pilot period. Specifically, a mental health consultant was hired through the local social service and mental health agency of the Jewish community (Jewish Child and Family Services) to develop a mental and emotional health component for the intervention. This consultant developed a culturally appropriate curriculum guide and held at least one 6-week series of sessions for each class in grades 5-8 in the girls’ school. The classes focused on stress management, conflict resolution, body image, and other issues related to mental health and eating disorders.

### Evaluation

All students in grades 1-8 were asked to complete baseline (fall 2006) and final (spring 2008) surveys. The surveys were administered during class by the classroom teacher. A slightly adapted version of the Hearts-N-Parks Survey was used for students in grades 1-4.<sup>18</sup> This survey uses pictures and simple questions to measure eating habits and intentions, nutritional knowledge, and attitudes related to physical activity. The response rates for the baseline survey (fall 2006) were 93% for the boys and 88% for the girls. In spring 2008, 62% of boys and 79% of girls responded. The surveys were done anonymously, so data could not be linked between surveys. Thus, scores were compared by grade (eg, second graders in 2006 vs second graders in 2008). First graders were not included in the analyses because the first graders in year 2 did not participate in the intervention in year 1 as kindergartners. After this exclusion, the sample size for 2006 was 196 (112 girls and 84 boys), whereas the sample size for 2008 was 190 (114 girls and 76 boys).

The survey for the older students (grades 5-8) measured eating habits, nutritional knowledge, physical activity, and attitudes related to nutrition, physical activity, and body image. Like the younger student surveys, they were administered during class by the classroom teacher. Unlike the younger student surveys, student names were collected. Whenever possible, validated questions were taken from existing surveys, such as the Youth Risk Behavior Survey.<sup>19</sup> For the baseline survey, 93% of boys and 88% of girls responded. For the final survey, 74% of boys and 58% of girls responded. Students in grade 8 in 2006 or in grade 5 in 2008 did not have data for both years and, thus, were not included. Data for both years were available for 107 students.

Other evaluation tools were utilized, including staff and parent surveys, body mass index (BMI)

measurement, and the SHI.<sup>20</sup> However, this article will focus on the outcomes assessed by the student surveys.

**Consent.** All parents were sent information about the project and were given the option of opting their child(ren) out of the evaluation component (ie, passive consent). In addition, child assent was obtained before the surveys were conducted at both time points.

### Data Analysis

Data were analyzed with SAS 9.2.<sup>21</sup> For the younger student surveys (grades 1-4), mean scores and standard deviations were provided for each variable. Differences by grade between pre- and postintervention were tested with Wilcoxon-Mann-Whitney rank sum test, which is the nonparametric equivalent to the 2-sample t-test. For the older student surveys (grades 5-8), all variables were dichotomized and proportions were presented for both years. Because names were attached to the surveys, data could be linked and analyzed longitudinally. The nonparametric McNemar's chi-square test was used to determine significance of differences between proportions.

## RESULTS

### Younger Student Surveys

Students in grades 2-4 were included in the first analysis. Table 1 displays selected health-related outcomes for girls. The most significant change for this age group following the intervention period was seen for nutritional knowledge. Specifically, the percentage of girls in grades 2 and 3 who could correctly identify the healthiest foods increased between 2006 and 2008. As an example, findings for one of the questions showed that the percentage of all girls who knew that

whole wheat bread was healthier than white bread increased from 75% to 93% (not shown). In addition, almost 100% could identify the unhealthiest foods, such as doughnuts, cookies, and candy. However, still only 36% got all 6 knowledge questions correct (compared with 18% in 2006).

Table 1 also reveals several other significant, but inconsistent, findings. For example, second-grade girls showed significantly lower scores for Eating Behaviors and Eating Intentions. This indicates that they reported eating more unhealthy foods and would select less healthy foods if given a choice. Fortunately, these negative findings were not seen for the other grades. In terms of physical activity, fourth-grade girls reported significantly more confidence in their physical abilities after the intervention.

The findings for boys are shown in Table 2. Only 2 significant findings are seen. For second-grade boys, reported Eating Behaviors were less healthy after the intervention. However, third-grade boys had significantly higher scores for Nutritional Knowledge.

### Older Student Surveys

Results for the older students (grades 5-8) are shown in Table 3. Selected measures related to knowledge, attitudes, behaviors, and environmental factors are displayed. The results of boys and girls are combined because few significant differences were seen by gender.

**Knowledge.** Students were asked how many servings of fruits and vegetables health experts recommend eating every day. They were also asked how many servings of dairy children should consume each day. The results show that only 15.9% of students at baseline knew that they should eat 5 or more servings of fruits and vegetables daily. By 2008, this number had

Table 1. Demographics and Health-Related Outcomes From the Student Survey for Girls in Grades 2-4

|                                  | Range | 2006 Mean (SD) <sup>†</sup> | 2008 Mean (SD) | Significant Difference <sup>‡</sup> |
|----------------------------------|-------|-----------------------------|----------------|-------------------------------------|
| Second grade                     |       | n = 36                      | n = 46         |                                     |
| Nutrition knowledge              | 0-7   | 4.78 (1.66)                 | 6.22 (0.76)    | ***                                 |
| Eating healthy                   | 0-7   | 4.47 (1.63)                 | 3.52 (1.75)    | **                                  |
| Eating intention                 | 0-6   | 3.39 (1.57)                 | 2.57 (1.67)    | *                                   |
| Confidence in physical abilities | 4-12  | 8.94 (2.20)                 | 9.65 (2.05)    |                                     |
| Third grade                      |       | n = 40                      | n = 46         |                                     |
| Nutrition knowledge              | 0-7   | 5.68 (1.07)                 | 6.50 (0.59)    | ***                                 |
| Eating healthy                   | 0-7   | 3.54 (1.74)                 | 4.46 (1.85)    |                                     |
| Eating intention                 | 0-6   | 2.90 (1.61)                 | 2.93 (1.63)    |                                     |
| Confidence in physical abilities | 4-12  | 9.71 (2.11)                 | 9.33 (1.86)    |                                     |
| Fourth grade                     |       | n = 36                      | n = 22         |                                     |
| Nutrition knowledge              | 0-7   | 5.64 (1.31)                 | 5.73 (1.35)    |                                     |
| Eating healthy                   | 0-7   | 3.86 (2.00)                 | 3.77 (1.66)    |                                     |
| Eating intention                 | 0-6   | 2.58 (1.71)                 | 1.95 (1.40)    |                                     |
| Confidence in physical abilities | 4-12  | 9.63 (1.65)                 | 10.55 (1.50)   | *                                   |

\*p ≤ .05; \*\*p ≤ .01; \*\*\*p ≤ .001.

<sup>†</sup>First graders were not included in the analyses because the first graders in year 2 did not participate in the intervention in year 1 as kindergartners.

<sup>‡</sup>Wilcoxon-Mann-Whitney rank sum test used to determine significance of differences.

**Table 2. Health-Related Outcomes From the Student Survey for Boys in Grades 2-4**

|                                  | Range | 2006 Mean (SD) <sup>†</sup> | 2008 Mean (SD) | Significant Difference <sup>‡</sup> |
|----------------------------------|-------|-----------------------------|----------------|-------------------------------------|
| Second grade                     |       |                             |                |                                     |
|                                  |       | n = 25                      | n = 31         |                                     |
| Nutrition knowledge              | 0-7   | 5.60 (1.50)                 | 5.81 (0.88)    |                                     |
| Eating healthy                   | 0-7   | 4.64 (1.66)                 | 3.58 (1.52)    | *                                   |
| Eating intention                 | 0-6   | 2.84 (1.46)                 | 2.58 (1.36)    |                                     |
| Confidence in physical abilities | 4-12  | 9.61 (1.64)                 | 9.84 (1.81)    |                                     |
| Third grade                      |       |                             |                |                                     |
|                                  |       | n = 26                      | n = 23         |                                     |
| Nutrition knowledge              | 0-7   | 4.88 (1.68)                 | 5.57 (1.90)    | *                                   |
| Eating healthy                   | 0-7   | 3.50 (1.53)                 | 3.52 (2.33)    |                                     |
| Eating intention                 | 0-6   | 2.27 (1.28)                 | 2.39 (1.97)    |                                     |
| Confidence in physical abilities | 4-12  | 10.54 (1.38)                | 10.25 (1.48)   |                                     |
| Fourth grade                     |       |                             |                |                                     |
|                                  |       | n = 33                      | n = 22         |                                     |
| Nutrition knowledge              | 0-7   | 5.18 (1.98)                 | 5.59 (1.89)    |                                     |
| Eating healthy                   | 0-7   | 3.03 (2.01)                 | 2.41 (1.89)    |                                     |
| Eating intention                 | 0-6   | 1.81 (1.69)                 | 1.73 (1.28)    |                                     |
| Confidence in physical abilities | 4-12  | 10.81 (1.51)                | 10.57 (1.36)   |                                     |

\*p ≤ .05.

<sup>†</sup>First graders were not included in the analyses because the first graders in year 2 did not participate in the intervention in year 1 as kindergartners.

<sup>‡</sup>Wilcoxon-Mann-Whitney rank sum test used to determine significance of differences.

**Table 3. Health-Related Outcomes for Students in Grades 5-8 (n = 107)<sup>†</sup>**

|                                      | 2006 <sup>‡</sup><br>Proportion | 2008<br>Proportion | Significant<br>Difference <sup>§</sup> |
|--------------------------------------|---------------------------------|--------------------|--|
| Knowledge                            |                                 |                    |  |
| Fruit/vegetable recommendations      | 15.9                            | 33.6               | **                                     |
| Dairy recommendations                | 24.3                            | 51.4               | ***                                    |
| Attitudes                            |                                 |                    |  |
| Unhappy with body                    | 20.6                            | 15.9               |  |
| Behavior                             |                                 |                    |  |
| Five fruits/vegetables daily         | 34.8                            | 34.8               |  |
| Breakfast daily                      | 52.3                            | 48.6               |  |
| Soda daily                           | 24.3                            | 23.4               |  |
| Fast food weekly                     | 25.2                            | 27.0               |  |
| Hour of activity 4 times/week        | 41.1                            | 61.7               | ***                                    |
| Exercising or dieting to lose weight | 46.7                            | 55.1               |  |
| Environment                          |                                 |                    |  |
| Class parties involve sweets         | 63.6                            | 70.1               |  |
| Parents encourage exercise           | 30.8                            | 36.5               |  |
| Parents limit sweets                 | 49.5                            | 50.5               |  |
| Parents limit soda                   | 64.5                            | 58.9               |  |
| Parents exercise with children       | 14.0                            | 10.3               |  |

\*\*p ≤ .01; \*\*\*p ≤ .001.

<sup>†</sup>All outcomes are dichotomous.

<sup>‡</sup>The 2006 data include students in grades 5-7; 2008 data include those same students 1 year later, in grades 6-8.

<sup>§</sup>McNemar's chi-square tests used to determine significance of differences between proportions.

increased to 33.6% (p < .01). A significant improvement was also seen for knowledge of dairy recommendations. Specifically, the percentage who answered correctly increased from 24.3% to 51.4%, which is significant at p < .001. In analyses not shown, it was discovered that the significant increase in knowledge for the fruit and vegetable recommendation was entirely due to increases by female students. Similarly,

increases in knowledge for the dairy recommendation were also more significant for females. Overall differences in the percent of students who knew this also favored girls.

**Attitudes.** Students were asked if they were happy with their body and physical appearance. While the percentage reporting that they were slightly or very unhappy with their body decreased from 20.6% to 15.9%, this difference did not attain statistical significance.

**Behavior.** Numerous questions were asked to measure intake of fruits and vegetables, breakfast, various beverages, and fast food, among other items. Questions related to physical activity and possible signs of disordered eating were also asked. The results show that the 1 significant change is that the percentage getting the recommended amount of daily activity (≥1 hour) 4 or more days of the week increased. Overall, less than half of students reported this level of activity before the intervention, but almost two-thirds reported it at the end (41.1% to 61.7%, p < .001). As before, gender differences were found (not shown). Specifically, the percentage of girls reaching this level of activity started off lower and saw a less significant increase (35.5% to 52.6%, p < .01, for girls; 54.8% to 83.9%, p < .01, for boys).

**Environment.** Students were asked a series of questions regarding the availability of healthy and unhealthy foods at home and school, as well as the extent to which their parents encourage physical activity. Unfortunately, no significant changes were seen in the number of class parties that include candy, cookies, cakes, or other sweets, nor in the limits that parents place upon the children regarding intake of sweets or soda. Similarly, the percentage reporting that their parents encouraged them to exercise or play sports increased, but not significantly. A question

about how often parents actually exercised with their children also showed a lack of improvement, as well as overall low numbers.

## DISCUSSION

After a community health survey revealed unusually high levels of childhood obesity in the largest Jewish community in Chicago, several local organizations came together to address the problem. A 2-year, culturally sensitive, school-based intervention was designed and implemented. During the first year, the coordinated school health model was adapted to take into account the unique structures and practices of the schools, and health education materials were created in accordance with the religious and cultural guidelines of the Orthodox community. During the second year, new policies and practices were implemented. The rigorous evaluation showed that important changes had taken place within the schools and that certain individual improvements were already evident as well.

At the school level, a wellness council was formed and a wellness policy was subsequently written, similar to those in place in most public school districts. They also took other steps that are generally required in public schools, such as incorporating a health curriculum and having a dietitian review their (limited) lunch offerings. Accomplishing these process objectives paved the way for individual improvements.

It is important to note that the goals of the evaluation process were 2-fold: (1) to guide the selection of intervention activities and to focus educational efforts and (2) to measure changes that could be attributed to these activities. Although the goal of the intervention was to stimulate changes in all outcomes (knowledge, attitudes, behaviors, and environmental factors related to nutrition or physical activity), the results show that the majority of significant changes occurred within the realm of knowledge. Specifically, the surveys showed that the younger girls and both older boys and girls significantly improved their nutritional knowledge. The only positive behavioral change seen was that older students were significantly more likely to get an hour or more of physical activity most days of the week after the intervention.

Despite the educational efforts directed at teachers and parents, the selected measures of environmental changes showed little improvement. Most disappointingly, measures such as the percentage of class parties involving sweets did not decrease, but instead remained the majority experience. The results highlighted the fact that even for those areas with improvement, there is still much room for continued progress. For example, only 35% of older students report eating 5 or more fruits and vegetables a day and only about half eat breakfast every day. Other

problems also became evident; for example, the data showed that approximately one-third of older boys eat fast food weekly and drink soda daily. In addition, a few negative changes in behaviors were found for the younger students, although only for certain grades or genders.

When comparing these findings to those reported by other studies, the students in this population generally fare better (postintervention) in terms of both knowledge and reported behaviors. For example, the preintervention percentage of students who knew the recommended number of fruits and vegetables to consume daily was similar in this study and in a sample of over 4000 students in Florida (16% vs 17%); however, 34% of the students in the current study knew this recommendation after the intervention.<sup>22</sup> This increase was similar to the changes seen in another study in which knowledge of this recommendation increased from 11% to 25%.<sup>23</sup> In addition, the percentage of students who actually consumed the targeted amount of fruits and vegetables was higher in the current sample compared with the Florida sample (35% at both time points vs 23%).<sup>22</sup> Given the higher starting values for many of these measures within the current sample, it would be expected to be even more difficult to observe significant improvements compared with studies in other populations. For example, other studies of individuals with relatively poor nutritional practices have been able to significantly increase the intake of fruits and vegetables reported by students after an intervention.<sup>23</sup> Other measures, such as soda consumption and physical activity, also indicated healthier lifestyles among students in the current sample.

More broadly, it is not unusual for interventions of this nature to first show changes in knowledge, followed by attitudes, then behaviors, and finally objective health outcomes. The most current review of school-based interventions reported that interventions that aim to improve health-related knowledge and behaviors among students often attain the first goal but struggle with the second.<sup>1</sup> It is also common for studies of these interventions to find inconsistent improvements among types of knowledge and behaviors, as well as between genders. For example, a recent large study conducted in the Netherlands found that their multicomponent school intervention resulted in a reduction in the consumption of sugar-sweetened beverages for boys and girls and a reduction in screen-time for boys, but no improvements in active commuting or the consumption of high-energy snacks for either gender.<sup>24</sup>

An expansion of the current project to more schools and an increased duration may help to determine why the findings of the pilot study are inconsistent and show little change in some areas. Specifically, this initiative was expanded to 3 additional schools for the 2008-2009 school year. Kindergarten classes for all

5 schools are now included as well. This brings the total number of students involved to over 2000. In addition, the scope of the project has been broadened to reflect a more general wellness focus (as opposed to the obesity prevention focus at the beginning of the project). Furthermore, funding was just secured for a fourth year during which all of the remaining schools in the system, including high schools, would be invited to participate. (There are approximately 15 schools in total.) Two particular goals of the fourth year will be to adapt both the model and the materials for high schools and to work within the school system to coordinate all health-related services (ie, social services, nursing, disability services, and the wellness initiative). To facilitate this expansion and to help ensure school buy-in, the programs and changes are increasingly being conceptualized as an initiative of the school system, rather than a research project conducted by 2 outside organizations. Future work also includes an effort to disseminate the model and materials to other Jewish school systems across the country. To facilitate this sharing of resources, a "how-to" manual has been written and an electronic compilation of the materials is available.

Beyond these efforts, other strategies to increase the sustainability of the initiative within the participating schools have been implemented. To begin, project staff have introduced school staff and parents to existing (and often free) resources and other potential sources of funding. After the first year of funding, schools were encouraged to find other sources of revenue to support their programs. To this end, the pilot schools have sought parent donations (which are not uncommon in day schools) to support specific programs; they have charged small fees to participate in certain activities or events; and they have even submitted at least one successful proposal for a grant from a local organization. More generally, the project has strongly emphasized making changes to policies and curriculum that will continue beyond the grant funding. The project has also attempted to focus the schools' efforts on making changes within existing activities and practices that are supported by the schools' operating budgets (or that do not have a cost), instead of holding one-time events that would be difficult or impossible to repeat after the grant ends. Through these strategies, we hope the schools will be able to continue making healthy changes on their own.

### Limitations

The current study has some notable limitations. To begin, all outcomes are based on self-report. More objective health outcomes, such as BMI or fitness tests, would be beneficial for this type of study. In addition, low response rates for the postintervention survey resulted in smaller sample sizes, which may

have contributed to a lack of statistical power in the models. Unfortunately, the reasons for the decline in response rates are not known. However, several changes were implemented in the subsequent waves of data collection to attempt to remedy this problem. Specifically, the distribution of grant funds to schools was tied to schools completing their evaluations on time and turning in all required reports. Another limitation is the lack of comparison schools. Randomly selecting schools into intervention or control groups would have helped to eliminate possible confounding factors that may have biased the results presented here. Moreover, the 2 participating schools were technically 2 campuses of the same school, only separated by gender. Finally, this pilot study was only 2 years long and included almost a full year of planning and development. It is expected that increasing the "dose" of the intervention, by increasing the intensity, frequency, and/or duration, would result in more positive changes. Fortunately, a third year of the intervention is currently under way, so the effects of an increase in the project duration can eventually be examined.

### Conclusions

Given the federal mandates, as well as the importance of good health for academic achievement,<sup>25-28</sup> schools are increasingly making changes to support student well-being. Although private schools are often exempt from the federal requirements regarding wellness councils and policies and may have fewer resources with which to work, they are still motivated to care for the health of their students. The pilot schools who participated in the current initiative demonstrated that they were willing to make substantial changes in their curriculum, policies, and practices. The challenge will be to replicate the model described here in other day schools without the benefit of significant financial support and professional guidance.

### IMPLICATIONS FOR SCHOOL HEALTH

The current study responds to the increasingly frequent and urgent calls for more research on how schools can best work to prevent and/or reduce childhood obesity. The unique sample and the community-based approach used both have valuable implications for the school health literature. The development of this intervention speaks to the importance of collecting local level data and making these data available to the community. Having such specific data was instrumental in engaging community members and organizations, tailoring the intervention, and attracting funders. The data regarding the high rates of childhood obesity within this Jewish community were also critical for highlighting the fact that even populations

that are not typically thought of as minority and communities with relatively high levels of education can struggle with elevated health risks.

In addition, the current initiative reiterates the need for researchers to fully engage the community in all phases of a project—from needs assessment to project development to implementation and evaluation. Obviously, this is particularly true when working in minority communities. Strictly implementing one of the many evidence-based school intervention models would most likely have resulted in a lack of schools willing to participate, low compliance with the intervention requirements, and poor response rates for the evaluation tools. Offering a modified and flexible model, based on continuous community feedback, was not only necessary for the pilot project to be implemented but also for increasing the likelihood of having a sustained effort within the schools and the broader community.

### Human Subjects Approval Statement

This study was approved by the Sinai Health System's institutional review board.

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