ARTICLE

A National Survey of Obesity Prevention Practices in Head Start

Robert C. Whitaker, MD, MPH; Rachel A. Gooze, MPH; Cayce C. Hughes, MPH; Daniel M. Finkelstein, PhD, EdM

Objective: To describe obesity prevention practices and environments in Head Start, the largest federally funded early childhood education program in the United States.

Design: Self-administered survey as part of the Study of Healthy Activity and Eating Practices and Environments in Head Start (SHAPES).

Setting: Head Start, 2008.

Participants: Directors of all 1810 Head Start programs, excluding those in US territories.

Outcome Measures: Descriptive measures of reported practices and environments related to healthy eating and gross motor activity.

Results: The 1583 (87%) programs responding to the survey enrolled 828 707 preschool children. Of these programs, 70% reported serving only nonfat or 1% fat milk. Ninety-four percent of programs reported that each day they served children some fruit other than 100% fruit juice; 97% reported serving some vegetable other than fried potatoes; and 91% reported both of these daily practices. Sixty-six percent of programs said they celebrated special events with healthy foods or nonfood treats, and 54% did not allow vending machines for staff. Having an onsite outdoor play area at every center was reported by 89% of programs. Seventy-four percent of programs reported that children were given structured (adult-led or -guided) gross motor activity for at least 30 minutes each day; 73% reported that children were given unstructured gross motor activity for at least 30 minutes each day, and 56% reported both of these daily practices.

Conclusion: Most Head Start programs report doing more to support healthy eating and gross motor activity than required by federal performance standards in these areas.

Arch Pediatr Adolesc Med. 2009;163(12):1144-1150

Author Affiliations: Departments of Public Health (Dr Whitaker, and Ms Gooze and Mr Hughes) and Pediatrics (Dr Whitaker), Center for Obesity Research and Education, Temple University, Philadelphia, Pennsylvania; and Mathematica Policy Research, Inc, Cambridge, Massachusetts (Dr Finkelstein).

HEAD START IS THE LARGEST federally funded early childhood education program in the United States, serving almost 1 million children from socioeconomically disadvantaged families.[1] Head Start uses a holistic approach to children's school readiness that goes beyond the domains of cognitive and socioemotional development to achieve outcomes in physical fitness, healthy nutrition, and gross motor skills.[2] Therefore, Head Start has great potential to help address the problem of childhood obesity, which affects between 15% and 25% of the children it serves.[3-6]

Head Start programs must abide by federal program performance standards.[7] These standards are intentionally broad to allow for the varied contexts in which programs are run. For example, while the standards do not use the term *physical activity*, they require programs to provide "sufficient time, indoor and outdoor space, equipment, materials and adult guidance for active play and movement that support the development of gross motor skills."[7] Regarding nutrition, the standards require that each child in a full-day program must receive meals and snacks that provide "one half to two-thirds of the child's daily nutritional needs" through foods "high in nutrients and low in fat, sugar and salt."[7] To cover the costs of the meals and snacks offered to children, Head Start programs must use funds from the US Department of Agriculture (USDA) by participating in either the Child and Adult Care Food Program[8] or the National School Lunch and Breakfast Programs,[9] adhering to the nutritional requirements of these USDA programs.

The Head Start Act of 2007 permits changes in the federal program performance standards including those that support "children's motor development and overall health and nutrition."[10] Meanwhile, efforts to prevent obesity are under way in Head Start.[11-13] Despite these favorable circumstances for programmatic change to address obesity in Head Start, there are no national data describing what Head Start programs are already doing in

this area that might exceed what is required by the existing program performance standards. Therefore, we undertook a study to describe obesity prevention practices and environments in Head Start programs and to identify program characteristics associated with variability in these practices and environments.

METHODS

OVERVIEW

Between February and April 2008 we administered a survey to all Head Start programs as part of the Study of Healthy Activity and Eating Practices and Environments in Head Start (SHAPES). The average program has approximately 6 centers, each with 50 to 60 children aged 3 and 4 years. The targeted survey respondents were program directors, who were encouraged to obtain assistance with the survey from their program's specialists in health and/or nutrition.

The survey was developed and administered in partnership with the US Department of Health and Human Services and the USDA. Administrative data and contact information for all 1890 programs were obtained from the Office of Head Start's 2007 Program Information Report.[14] We excluded 50 programs in US territories, 27 that did not provide direct services to children, and 3 that provided all services outside of centers, leaving a final sample of 1810 programs. The study was approved by the Institutional Review Board of Temple University.

INSTRUMENT DEVELOPMENT AND SURVEY ADMINISTRATION

Some of the SHAPES survey items were adapted from existing instruments[15-18]; others were based on guidelines or policies regarding nutrition and physical activity in childcare or early childhood education settings outside of Head Start.[19,20] Drafts of the instrument were reviewed by federal staff and by several nonfederal content experts. The instrument was further refined based on cognitive interviews and pretesting with 7 Head Start program directors, each from different states. The final survey contained 90 items, could be completed in less than 30 minutes, and did not require program staff to conduct menu analysis or record review.

To reduce bias, we assured programs that their individual responses would not be shared with federal agencies, and we introduced the survey with the following statement: "This study is not an assessment of whether your program is meeting certain Head Start program performance standards. We expect that most programs have not adopted many of the practices described in this survey. This is because these practices are not currently an explicit part of Head Start's program performance standards."

Program directors were mailed a paper survey. After sending reminders by electronic and postal-service mail, we reached nonresponding programs by telephone and allowed them to complete the survey over the telephone. Data from all completed surveys were linked to data on program characteristics contained in the Program Information Report.

ANALYTIC VARIABLES

This article is focused on 30 yes/no items regarding the presence of practices and environments related to healthy eating (15 items) and physical (gross motor) activity (15 items). From these 30 items, we created 2 summary scores. From the 15 items describing practices and environments related to healthy eating, we developed a healthy eating score. Similarly, we developed a gross motor score from the 15 items related to children's gross motor activity. Similar summary scores have been applied previously to descriptions of school food environments.[21,22] Using a score addresses the inherent limitation of making multiple comparisons between several program characteristics and each of the 30 items. Each score had a value between 0 and 15 (1 point given for each "yes" response), with a higher score indicating a more favorable environment for obesity prevention. We did not compute scores for the 27 programs that were missing more than 3 items from either score. For the remaining 1556 programs, any missing items were assigned a value of 1 because programs were more likely than not to have any given practice or environment. Only 21 programs had missing data for more than 2 of the 30 items.

From the Program Information Report data, we created 8 categorical variables to describe program characteristics (**Table 1**) that we hypothesized might be associated with variation in the 2 scores. These variables were selected based on discussions with federal staff and prior research assessing sources of variation in the educational environments of Head Start programs[23-25] and in the physical activity levels of preschoolers in child care settings.[26-28] Geographic region and rural-urban location were derived from the program address. Because there were too few programs in some states to make meaningful comparisons between programs at the state level, we grouped programs by 9 geographic regions based on the US Census Bureau geographic divisions.[29] We also grouped programs along a rural-urban continuum, linking the county of each program to its USDA rural-urban continuum code.[30]

STATISTICAL ANALYSIS

We first described the program characteristics using the 8 variables derived from the Program Information Report. We also described the program context for providing meals and snacks using survey items about (1) the source (provider) of meals, (2) the location where meals were prepared, (3) the amount of perceived control over the food and beverages served, and (4) the percentage of food costs reimbursed by the USDA. We then described the 30 obesity prevention practices and environments in Head Start.

Using 1-way analysis of variance, we compared the mean healthy eating and gross motor scores across the levels of each program characteristic. Using multivariable linear regression models, with the healthy eating and gross motor scores as dependent variables, we derived the mean score at each level of a program characteristic after adjusting for the other program characteristics. We also used these regression models to identify the program characteristics that had a significant independent association with the score.

For program characteristics that were independently associated with a given score, we examined the association between that characteristic and each of the 15 binary variables that comprised the score. The purpose of these analyses was to explore whether some items in the score were more strongly associated with the program characteristic than others.

RESULTS

Surveys were completed by 1583 (87%) programs, with 188 programs completing the survey by telephone. In each stratum of the program characteristics shown in Table 1, the response rate was 81% or higher (data not shown). In 27% of programs, the program director completed the survey without assistance from other staff. Of the re-

Table 1. Characteristics of Head Start Programs

Characteristic	No. (%)[a]
Geographic region	
New England (ME, NH, VT, MA, RI, CT)	78 (5)
Middle Atlantic (NY, NJ, PA)	224 (14)
South Atlantic (DE, MD, DC, VA, WV, NC, SC, GA, FL)	238 (15)
East North Central (OH, IN, IL, MI, WI)	278 (18)
East South Central (KY, TN, AL, MS)	112 (7)
West North Central (MN, IA, MO, ND, SD, NE, KS)	143 (9)
West South Central (AR, LA, OK, TX)	166 (10)
Mountain (MT, ID, WY, CO, NM, AZ, UT, NV)	141 (9)
Pacific (WA, OR, CA, AK, HI)	203 (13)
Rural-urban continuum	
Large metropolitan area (population ≥1 million persons)	548 (35)
Small metropolitan area (population <1 million persons)	482 (30)
Small city or town (nonmetropolitan)	368 (23)
Rural	185 (12)
Entity administering the program	
Community action agency	548 (35)
School system	301 (19)
Not-for-profit agency (not community action)	533 (34)
Tribal government or consortium	118 (7)
Other (government agency or for-profit)[b]	83 (5)
Children enrolled, No.	
<210	514 (32)
210-459	536 (34)
≥460	533 (34)
Program director has graduate degree	
No	649 (41)
Yes	934 (59)
Teachers with college or graduate degree in early childhood education, %	
<25	504 (32)
25-59	562 (35)
≥60	517 (33)
Single-parent families, %	
≥55	533 (34)
40-54	526 (33)
<40	524 (33)
Families with parent education less than high school, %	
≥35	487 (31)
20-34	556 (35)
<20	540 (34)

[a] Numbers across categories of each program characteristic add to 1583. Percentages are rounded to add to 100% across categories of each program characteristic.
[b] Seventy-five of the 83 programs (90.3%) were administered by a government agency.

Table 2. Contextual Characteristics of Head Start Programs Related to Serving Meals and Snacks

Characteristic	Percentage[a]
Provider of meals	
Food service program of school or district	31
Cooks hired directly by the program	55
Food service company (not part of school or district)	10
Other	4
Location where meals are prepared	
At or adjacent to center	65
Away from center and delivered	30
Combination or other[b]	5
Perceived amount of control over content of food and beverages served	
A great deal	68
Some	29
None	3
Costs reimbursed by USDA, %	
100	23
80-99	46
70-79	12
<70	19

Abbreviation: USDA, US Department of Agriculture.
[a] Percentages are rounded to add to 100% across categories of each program characteristic. Across the 1583 responding programs, response rates for these items ranged from 96.9% (n = 1534) to 99.7% (n = 1579).
[b] Most of these programs (91.7%) reported a combination of "at or adjacent to center" and "away from center and delivered."

maining programs, for whom this task was shared, the primary respondent was the following person: program director (41%), health and/or nutrition specialist (47%), or education specialist or other staff member (12%). Of the 1583 responding programs, the median number of students in each program was 314 and the median number of Head Start centers was 6. These programs enrolled 828 707 children across 13 607 centers, 89% and 90% of all Head Start children and centers, respectively.

Thirty-one percent of programs reported that the primary source of their meals was the food service program of a school or school district, while 55% hired cooks directly (**Table 2**). Approximately two-thirds of programs reported that they had "a great deal of control" over the types of foods and beverages served to children. More than 75% of programs reported that the USDA reimbursed them less than 100% "of the total costs for all meals and snacks served." In those programs in which USDA reimbursement did not cover the full costs, 93% used money from their Head Start program budget to make up for some or all of the remaining costs.

The prevalence of the 30 practices and environments that comprised the healthy eating and gross motor scores are shown in **Table 3** and **Table 4**, respectively. Ninety-one percent of programs reported serving some fruit each day other than 100% juice and some vegetable other than fried potatoes. Fifty-six percent of programs provided children with at least 30 minutes per day of structured (adult-led or -guided) gross motor activity and at least 60 minutes per day of unstructured gross motor activity. Eighty-nine percent of programs reported that every center had an on-site play area. Of the programs without an on-site outdoor play area at every center, 77% reported that all of their centers had access to an off-site area within walking distance of the center.

The mean (SD) healthy eating and gross motor scores were 11.8 (2.0) and 11.2 (2.1), respectively. The healthy eating scores ranged from 4 to 15, and the gross motor scores ranged from 2 to 15. We considered differences between scores of more than 0.5 points (approximately 0.25 SD) to be meaningful. Geographic region was the program characteristic with the strongest independent relationship to both scores (**Table 5**). Healthy eating scores also had a strong independent association with the type of entity administering the program, indicating that those programs administered by a school system had lower (less healthy) scores. Programs administered by tribal governments had somewhat lower gross motor scores. We found no meaningful independent associations between either of the 2 scores and the characteristics of programs' teachers or students.

Table 3. Fifteen Practices and Environments Related to Healthy Eating in Head Start Programs

Practice or Environment	Percentage[a]
Serve each day some fruit other than 100% fruit juice	94
Serve each day some vegetable other than French fries, tater tots, or hash browns	97
Prepare cooked vegetables without adding meat fat, margarine, lard, or butter	86
Milk served to most children is either skim (non-fat) or 1% fat	70
Celebrate holidays or special events, such as birthdays, with either healthy foods or non-food treats, such as stickers	66
Never serve or serve <1×/wk fried or pre-fried meats, such as chicken nuggets, corn dogs, or fish sticks	71
Never serve or serve <1×/wk high-fat meats, such as sausage, bacon, hot dogs, bologna, or ground beef	74
Never serve or serve <1×/wk sweets, such as cookies or cakes	86
Never serve sugary drinks, such as Kool-Aid, sports drinks, sweet tea, punches, or soda	99
Never serve juice drinks that are less than 100% fruit juice	95
Never serve flavored milk, such as chocolate or strawberry	59
Do not allow soda or other vending machines for staff use[b]	54
Staff not allowed to consume foods or beverages in front of children that are different than those the children are served	94
Have written guidelines about feeding children	70
Use an available curriculum that focuses on nutrition	61

[a] Across the 1583 responding programs, response rates for these items ranged from 97.3% (n = 1540) to 99.6% (n = 1577).
[b] Only 11 of the 1579 programs (0.7%) reported "having soda or other vending machines available for children to use."

Table 4. Fifteen Practices and Environments Related to Gross Motor Activity in Head Start Programs

Practice or Environment	Percentage[a]
Children are given structured (adult-led or -guided) gross motor activity for at least 30 min per day[b]	74
Children are given the opportunity for unstructured gross motor activity for at least 60 min per day[b]	73
Children are not kept sitting (excluding naps and meals) for more than 30 min at a time[b]	96
Television and video use is limited to less than 60 min per day[c]	90
Children take field trips at least once per month	43
Every center in the program has an on-site outdoor play area	89
Outdoor play areas have a large open area for group games	98
Outdoor play areas have natural elements (eg, trees, shrubs, smooth rocks, or uneven terrain) which the children are free to use during play	58
Outdoor play areas have a shaded space that is large enough for group games	70
Outdoor play areas have enough fixed play equipment (eg, slide, swing, or climbing structure) so that children can use it without too much competition	93
Outdoor play areas have enough portable play equipment (eg, balls, hoops, or sand toys) so that children can use it without too much competition	94
Outdoor play areas have enough wheeled toys (eg, wagons or tricycles) so that children can use them without too much competition	81
Have enough equipment that is appropriate for gross motor activity for children with physical disabilities	41
Have written guidelines about encouraging children's gross motor activity	62
Use an available curriculum that focuses on gross motor activity	54

[a] Across the 1583 responding programs, response rates for these items ranged from 97.0% (n = 1535) to 99.6% (n = 1576).
[b] For children attending full-day programs.
[c] Eighty-nine percent of programs reported that "television and videos are used only for instructional purposes."

Across the 9 geographic regions, the prevalence of the individual practice or environmental factor differed by 20% or more for 8 of the 15 healthy eating items (eTable 1; http://www.archpediatrics.com) and for 7 of the 15 gross motor items (eTable 2). We divided the 9 regions into tertiles (3 groups of 3) based on the adjusted mean healthy eating scores in each region, and we did the same based on the adjusted mean gross motor scores (Table 5). Only 1 region (Pacific) was in the highest tertile for both the healthy eating and gross motor scores, and no regions were in the lowest tertile for both scores.

Because of the association between programs being administered by a school system and the healthy eating score, we examined whether being administered by a school system was related to whether a program obtained its meals from the food service program of a school or school district, and how this, in turn, was related to the program's healthy eating score. Of the programs administered by a school system, 88% used a school food service as the source of their meals, compared with 17% of programs not administered by a school system ($P<.001$). Programs that used a school food service as their source of meals had significantly lower healthy eating scores than programs that did not use a school food service (10.9 vs 12.2; $P<.001$). This difference was also observed in programs administered by a school system (10.7 vs 12.0; $P<.001$) and those not administered by a school system (11.3 vs 12.2; $P<.001$). Across all programs, those administered by a school system had mean (SD) healthy eating scores that were approximately 1 (0.5) point lower than those not administered by a school system (10.8 vs 12.0; $P<.001$). However, this difference was reduced to approximately half of a point when controlling for the source of meals (11.4 vs 11.9; $P=.002$). This finding suggests that the relationship between programs being administered by a school system and having a lower healthy eating score is mediated, in part, by the program's use of a school food service as the source of its meals.[31]

Programs that used a school food service as the source of their meals differed in several ways from those that did not. For 5 of the 15 practices and environments on the healthy eating score, the prevalence was at least 10% lower in programs that used a school food service (**Table 6**). In addition, programs that used a school food service were less likely to obtain 100% reimbursement of their food costs from the USDA (18% vs 25%; $P=.001$), less likely to perceive a "great deal of control" over the food and beverages served (22% vs 88%; $P<.001$), and less likely to have meals prepared at or adjacent to their Head Start centers (55% vs 70%; $P<.001$).

Table 5. Healthy Eating and Gross Motor Scores by Head Start Program Characteristics[a]

Characteristic	Healthy Eating Score, Mean (SE)[b]	*P* Value[c]	Gross Motor Score, Mean (SE)[b]	*P* Value[c]
Geographic region				
New England (ME, NH, VT, MA, RI, CT)	13.0 (0.2)		11.0 (0.2)	
Middle Atlantic (NY, NJ, PA)	12.5 (0.1)		10.7 (0.2)	
South Atlantic (DE, MD, DC, VA, WV, NC, SC, GA, FL)	11.1 (0.1)		11.0 (0.1)	
East North Central (OH, IN, IL, MI, WI)	11.5 (0.2)		10.5 (0.2)	
East South Central (KY, TN, AL, MS)	11.6 (0.1)	<.001	11.5 (0.1)	<.001
West North Central (MN, IA, MO, ND, SD, NE, KS)	11.1 (0.2)		11.2 (0.2)	
West South Central (AR, LA, OK, TX)	11.2 (0.2)		11.5 (0.2)	
Mountain (MT, ID, WY, CO, NM, AZ, UT, NV)	11.8 (0.2)		11.7 (0.2)	
Pacific (WA, OR, CA, AK, HI)	12.6 (0.2)		11.7 (0.2)	
Rural-urban continuum				
Large metropolitan area (population ≥1 million persons)	11.7 (0.1)		11.1 (0.1)	
Small metropolitan (population <1 million persons)	11.9 (0.1)	.18	11.3 (0.1)	.46
Small city or town (nonmetropolitan)	11.8 (0.1)		11.2 (0.1)	
Rural	11.6 (0.2)		11.2 (0.2)	
Entity administering the program				
Community action agency	12.0 (0.1)		11.2 (0.1)	
School system	11.0 (0.1)		11.2 (0.1)	
Not-for-profit agency (not community action)	12.0 (0.1)	<.001	11.4 (0.1)	.01
Tribal government or consortium	11.8 (0.2)		10.6 (0.2)	
Other (government agency or for-profit)	11.8 (0.2)		10.9 (0.2)	
Children enrolled, %				
<210	11.7 (0.1)		11.3 (0.1)	
210-459	11.8 (0.1)	.49	11.2 (0.1)	.80
≥460	11.8 (0.1)		11.2 (0.1)	
Director has graduate degree				
No	11.9 (0.1)	.17	11.2 (0.1)	.98
Yes	11.7 (0.1)		11.2 (0.1)	
Teachers with college or graduate degree in early childhood education, %				
<25	11.8 (0.1)		11.4 (0.1)	
25-59	11.8 (0.1)	.97	11.0 (0.1)	.006
≥60	11.8 (0.1)		11.2 (0.1)	
Single-parent families, %				
≥55	11.9 (0.1)		11.2 (0.1)	
40-54	11.7 (0.1)	.25	11.2 (0.1)	.90
<40	11.8 (0.1)		11.2 (0.1)	
Families with highest parent education less than high school, %				
≥35	11.8 (0.1)		11.2 (0.1)	
20-34	11.8 (0.1)	.73	11.2 (0.1)	.79
<20	11.7 (0.1)		11.2 (0.1)	

[a] Scores were based on a sample of 1556. Twenty-seven programs that were missing data for more than 3 items in either the healthy eating or gross motor score were excluded from these analyses.
[b] Scores are adjusted for the 7 other program characteristics listed in the table.
[c] *P* values are from the *F* change statistic in a linear regression model in which the specified program characteristic (as a group of dummy variables) is added to a model already containing the other 7 program characteristics.

COMMENT

In this national survey of all Head Start programs, we found that most programs reported practices and environments related to healthy eating and gross motor activity that went beyond the existing federal program performance standards in these areas. For example, while the performance standards have no quantitative guidelines for the amount of children's daily physical activity, more than half of programs reported that they provided at least 30 minutes of daily, structured gross motor activity and at least 60 minutes of unstructured gross motor activity. In the standards for meals served in Head Start, as outlined by the Child and Adult Care Food Program,[8] 100% fruit juice and fried potatoes are classified as a fruit and a vegetable, respectively, and whole milk can be served. However, most Head Start programs are serving a daily fruit other than 100% fruit juice, a daily vegetable other than fried potatoes, and lowfat milk (skim or 1% fat).

The variation we observed in obesity prevention practices by geographic region was not explained by any of the characteristics of the programs' staff or children. The variation might be due to geographic differences reflected in policies, broader sociocultural norms, or economic conditions. Such place-based factors, ranging from land-use mix[32] to regional food preferences[33] to income inequality,[34] have been associated with variation in the prevalence of obesity. Similar factors may also shape the contexts in which individual Head Start programs are nested,[35] making it more or less difficult for Head Start programs in some regions to support obesity prevention efforts.

Our data suggest that programs administered by a school system are very likely to use the food service program of that school system as the source of the meals they serve. Using the school food program, compared with not doing so, appears to be associated with at least 3 disadvantages: a less healthy eating environment, lower perceived control over the foods and beverages served, and a lower proportion of food costs being reimbursed. More needs to be known before making any programmatic recommendation based on these findings. There may be potential advantages that we did not identify associated with using the school food service. More importantly, there may be cost and quality advantages, unrelated to nutrition, for programs that are administered by a school system. It is not clear whether these programs have other options for obtaining their meals outside the school food service, such as by hiring cooks directly.

Despite the high response rate of the survey, which attempted to reach all Head Start programs, this study had several limitations. Programs may have reported practices that were expected in centers and classrooms but which were not always occurring there. We did not attempt to validate program reports of practices or environments with on-site observations or record reviews such as analysis of a program's meal menus or written staff guidelines. In completing the survey, most program directors received assistance from other management staff. However, in large programs with many centers, the respondents may still have lacked knowledge of specific practices related to obesity prevention. In addition, the survey required programs to characterize their average practices across centers. This made it more likely that programs with large between-center variability would misclassify their program practices. The healthy eating and gross motor scores combined variables that described different dimensions within these 2 broad domains (eg, type of milk served combined with teacher access to vending machines and minutes of structured physical activity combined with access to outdoor play areas). It is possible, therefore, that aggregating 30 items on practices and environments into 2 scores obscured some meaningful differences in these 30 individual items by program characteristics.

In the last several years, there has been great interest in the opportunities afforded by schools to prevent obesity,[36-38] and there have been several comprehensive assessments of eating and physical activity-related practices and environments in US public schools.[21,39-41] However, there are very few data describing obesity prevention practices and environments in either childcare or early childhood education settings.[42,43] This is the first national report on practices and environments related to healthy eating and physical activity in Head Start. This report comes at a time when there is increasing consensus to make greater public investments in early childhood education[44,45] and to begin childhood obesity prevention efforts early in life.[37,46] As Head Start and other early childhood programs try to take advantage of their unique position to prevent childhood obesity, the results of this survey provide programs with a list of practices and environments that are potential targets for change and with a baseline against which these changes can be assessed.

Table 6. Practices and Environments Related to Healthy Eating in Head Start by Whether Meals Are Provided by School or School District[a]

	Meals Provided by School or School District, %	
Healthy Eating Score Item	Yes (n=475)	No (n=1076)
Daily fruit other than 100% fruit juice	91	95
Daily vegetable other than fried potatoes	94	98
Prepare cooked vegetables without adding fats	85	87
Serve only low-fat milk (skim or 1% fat)	77	68
Use healthy foods or non-food treats to celebrate	66	67
Never or <1×/wk serve fried or pre-fried meats[b]	46	82
Never or <1×/wk serve high-fat meats[b]	62	80
Never or <1×/wk serve sweets	82	87
No sugary drinks	98	99
No juice drinks less than 100% fruit juice	90	97
No flavored milk[b]	45	65
Do not allow staff to use vending machines[b]	42	59
Staff must eat same foods and beverages as children[b]	87	97
Use an available curriculum on healthy eating	65	60
Written guidelines about feeding children	65	73

[a] n=1551. Includes the 1556 programs for which the healthy eating score was computed and excludes 5 programs with missing data on the source of meals.
[b] Indicates differences of 10 or more percentage points.

Submitted for Publication: May 11, 2009; final revision received June 14, 2009; accepted June 15, 2009.
Correspondence: Robert C. Whitaker, MD, MPH, Temple University, Center for Obesity Research and Education, 3223 N Broad St, Ste 175, Philadelphia, PA 19140 (rwhitaker@temple.edu).
Author Contributions: Dr Whitaker had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Whitaker. *Acquisition of data:* Whitaker. *Analysis and interpretation of data:* Whitaker, Gooze, Hughes, and Finkelstein. *Drafting of the manuscript:* Whitaker, Gooze, and Hughes. *Critical revision of the manuscript for important intellectual content:* Whitaker, Gooze, Hughes, and Finkelstein. *Statistical analysis:* Whitaker. *Obtained funding:* Whitaker. *Administrative, technical, and material support:* Whitaker, Gooze, Hughes, and Finkelstein. *Study supervision:* Whitaker.
Financial Disclosure: None reported.
Funding/Support: This study was supported by Healthy Eating Research Program grant 63042 and Active Living Research Program grant 64114 from the Robert Wood Johnson Foundation, and it was carried out in partnership with the US Department of Health and Human Services and the US Department of Agriculture.
Disclaimer: The opinions expressed do not reflect those of either the Robert Wood Johnson Foundation or the US Government.
Additional Information: The eTables are available at http://www.archpediatrics.com.
Additional Contributions: We thank the following individuals at Mathematica Policy Research, Inc, for their assistance in survey development and data collection: Linda

Mendenko, Alison Guy, Elaine Hill, and Anna Comerford. We thank Sara Benjamin, MD, PhD, Marsha Dowda, DrPH, Kerry McIver, PhD, and Catherine Polanski for their helpful suggestions during survey development, and Prabhu Ponkshe, Amy Requa, MSN, CRNP, James Sallis, PhD, and Mary Story, PhD, for feedback on an earlier draft of this manuscript. The following federal staff provided critical review on drafts of the survey instrument and/or this manuscript: Julie Brewer, MPA, Keith Churchill, John Endhal, PhD, Joanne Guthrie, PhD, MPH, and Jay Hirschman, MPH, CNS, United States Department of Agriculture; Robin Brocato, MHS, Amanda Bryans, Laura Hoard, PhD, and Lauren Supplee, PhD, Department of Health and Human Services. Finally, we would like to thank the National Head Start Association for announcing the Study of Healthy Activity and Eating Practices and Environments in Head Start and the programs for completing the survey.

REFERENCES

1. About the Office of Head Start. US Department of Health and Human Services, Administration for Children and Families Web site. http://www.acf.hhs.gov/programs/ohs/about/index.html#factsheet. Accessed February 14, 2009.
2. The Head Start Child Outcomes Framework. US Department of Health and Human Services, Administration for Children and Families Web site. http://eclkc.ohs.acf.hhs.gov/hslc/ecdh/eecd/Assessment/Child%20Outcomes/edudev_art_00090_080905.html. Accessed February 13, 2009.
3. Anderson SE, Whitaker RC. Prevalence of obesity among US preschool children in different racial and ethnic groups. *Arch Pediatr Adolesc Med*. 2009;163(4):344-348.
4. Feese M, Franklin F, Murdock M, et al. Prevalence of obesity in children in Alabama and Texas participating in social programs. *JAMA*. 2003;289(14):1780-1781.
5. New York City vital signs: obesity in early childhood. New York City Department of Health and Mental Hygiene, Administration for Children's Services/Head Start Web site. http://www.nyc.gov/html/doh/downloads/pdf/survey/survey-2006childobesity.pdf. Published March 2006. Accessed May 1, 2006.
6. Whitaker RC, Orzol SM. Obesity among US urban preschool children: relationships to race, ethnicity, and socioeconomic status. *Arch Pediatr Adolesc Med*. 2006;160(6):578-584.
7. Office of Head Start. Legislation and regulations: Head Start program performance standards (45 CFR part 1304). US Department of Health and Human Services, Administration for Children and Families Web site. http://www.acf.hhs.gov/programs/ohs/legislation/index.html. Accessed February 13, 2009.
8. Child and Adult Care Food Program: regulations (7 CFR Part 226). US Department of Agriculture, Food and Nutrition Service Web site. http://www.fns.usda.gov/cnd/Care/Regs-Policy/Regulations.htm. Accessed February 13, 2009.
9. School meals: program regulations (7 CFR Parts 210, 220). US Department of Agriculture, Food and Nutrition Service Web site. http://www.fns.usda.gov/cnd/governance/regulations.htm. Accessed February 13, 2009.
10. Head Start Act §641a, 42 USC §9801, Pub L No. 110-134 (2007). Early Childhood Learning & Knowledge Center Web site. http://eclkc.ohs.acf.hhs.gov/hslc/Program%20Design%20and%20Management/Head%20Start%20Requirements/Head%20Start%20Act. Accessed February 14, 2009.
11. Fitzgibbon ML, Stolley MR, Schiffer L, Van Horn L, Kaufer Christoffel K, Dyer A. Hip-Hop to Health Jr. for Latino preschool children. *Obesity (Silver Spring)*. 2006;14(9):1616-1625.
12. Fitzgibbon ML, Stolley MR, Schiffer L, Van Horn L, Kaufer Christoffel K, Dyer A. Two-year follow-up results for Hip-Hop to Health Jr: a randomized controlled trial for overweight prevention in preschool minority children. *J Pediatr*. 2005;146(5):618-625.
13. Finkelstein D, Whitaker RC, Hill E, Fox MK, Mendenko L, Boller K. Results from the "I Am Moving, I Am Learning" stage 1 survey. Princeton, NJ: Mathematica Policy Research Inc; 2007. http://www.acf.hhs.gov/programs/opre/hs/eval_move_learn/reports/stage1_survey/stage1_survey.pdf. Accessed February 14, 2009.
14. Office of Head Start Program Information Report. Office of Head Start Web site. http://eclkc.ohs.acf.hhs.gov/PIR. Accessed February 18, 2009.
15. Ammerman AS, Ward DS, Benjamin SE, et al. An intervention to promote healthy weight: Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) theory and design [published online ahead of print June 15, 2007]. *Prev Chronic Dis*. 2007;4(3):A67.
16. Benjamin SE, Neelon B, Ball SC, Bangdiwala SI, Ammerman AS, Ward DS. Reliability and validity of a nutrition and physical activity environmental self-assessment for child care. *Int J Behav Nutr Phys Act*. 2007;4:29.
17. DeBord K, Hestenes LL, Moore RC, Cosco NG, McGinnis JR. *Preschool Outdoor Environment Measurement Scale-POEMS*. Winston Salem, NC: Kaplan Inc; 2005.
18. Sigman-Grant M, Christiansen E, Branen L, Fletcher J, Johnson SL. About feeding children: mealtimes in child-care centers in four western states. *J Am Diet Assoc*. 2008;108(2):340-346.
19. New York City Board of Health. *Notice of Adoption of Amendments to Article 47 of the New York City Health Code, Daycare Services*. New York, NY: New York City Dept of Health and Mental Hygiene; 2006.
20. National Association for Sport and Physical Education. *Active Start: a Statement of Physical Activity Guidelines for Children Birth to Five Years*. Reston, VA: National Association for Sport and Physical Education; 2002.
21. Finkelstein DM, Hill EL, Whitaker RC. School food environments and policies in US public schools. *Pediatrics*. 2008;122(1):e251-e259.
22. Kubik MY, Lytle LA, Story M. Schoolwide food practices are associated with body mass index in middle school students. *Arch Pediatr Adolesc Med*. 2005;159(12):1111-1114.
23. Zill N, Resnick G, Kim K, et al. Head Start Performance Measures Center Family and Child Experiences Survey (FACES 2000) Technical Report. Washington, DC: US Department of Health and Human Services, Administration for Children and Families; 2006. http://www.acf.hhs.gov/programs/opre/hs/faces/reports/technical_2000_rpt/tech2k_final2.pdf. Accessed February 16, 2009.
24. Zill N, Resnick G, Kim K, et al. Head start FACES 2000: a whole-child perspective on program performance. Washington, DC: US Department of Health and Human Services, Administration for Children and Families; 2003. http://www.acf.hhs.gov/programs/opre/hs/faces/reports/faces00_4thprogress/faces00_4thprogress.pdf. Accessed February 16, 2009.
25. Love J, Meckstroth A, Sprachman S. Measuring the quality of program environments in head start and other early childhood programs: a review and recommendations for future research. Washington, DC: National Center for Education Statistics, US Department of Education; 1997. http://nces.ed.gov/pubs97/9736.pdf. Accessed February 13, 2009.
26. Bower JK, Hales DP, Tate DF, Rubin DA, Benjamin SE, Ward DS. The childcare environment and children's physical activity. *Am J Prev Med*. 2008;34(1):23-29.
27. Dowda M, Brown WH, McIver KL, et al. Policies and characteristics of the preschool environment and physical activity of young children. *Pediatrics*. 2009;123(2):e261-e266.
28. Dowda M, Pate RR, Trost SG, Almeida MJ, Sirard JR. Influences of preschool policies and practices on children's physical activity. *J Community Health*. 2004;29(3):183-196.
29. Census regions and divisions of the United States. US Census Bureau Web site. http://www.census.gov/geo/www/us_regdiv.pdf. Accessed February 16, 2009.
30. Measuring rurality: rural-urban continuum codes. US Department of Agriculture, Economic Research Service Web site. http://www.ers.usda.gov/briefing/rurality/RuralUrbCon/. Accessed February 13, 2009.
31. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol*. 1986;51(6):1173-1182.
32. Frank LD, Andresen MA, Schmid TL. Obesity relationships with community design, physical activity, and time spent in cars. *Am J Prev Med*. 2004;27(2):87-96.
33. Kumanyika SK. Environmental influences on childhood obesity: ethnic and cultural influences in context. *Physiol Behav*. 2008;94(1):61-70.
34. Singh GK, Kogan MD, van Dyck PC. A multilevel analysis of state and regional disparities in childhood and adolescent obesity in the United States. *J Community Health*. 2008;33(2):90-102.
35. Glass TA, McAtee MJ. Behavioral science at the crossroads in public health: extending horizons, envisioning the future. *Soc Sci Med*. 2006;62(7):1650-1671.
36. Institute of Medicine. *Nutrition Standards for Foods in Schools: Leading the Way Toward Healthier Youth*. Washington, DC: National Academies Press; 2007.
37. Institute of Medicine. *Preventing Childhood Obesity: Health in the Balance*. Washington, DC: The National Academies Press; 2005.
38. American Academy of Pediatrics Committee on School Health. Soft drinks in schools. *Pediatrics*. 2004;113(1 pt 1):152-154.
39. Gordon A, Fox MK. School nutrition dietary assessment study III: summary of findings. Alexandria, VA: US Department of Agriculture, Food and Nutrition Service, Office of Research, Nutrition, and Analysis; 2007. http://www.fns.usda.gov/ora/MENU/Published/CNP/FILES/SNDAIII-SummaryofFindings.pdf. Accessed February 16, 2009.
40. O'Toole TP, Anderson S, Miller C, Guthrie J. Nutrition services and foods and beverages available at school: results from the School Health Policies and Programs Study 2006. *J Sch Health*. 2007;77(8):500-521.
41. Lee SM, Burgeson CR, Fulton JE, Spain CG. Physical education and physical activity: results from the School Health Policies and Programs Study 2006. *J Sch Health*. 2007;77(8):435-463.
42. Benjamin SE, Cradock A, Walker EM, Slining M, Gillman MW. Obesity prevention in child care: a review of US state regulations. *BMC Public Health*. 2008;8:188.
43. Benjamin SE, Copeland KA, Cradock A, et al. Menus in child care: a comparison of state regulations with national standards. *J Am Diet Assoc*. 2009;109(1):109-115.
44. Heckman JJ. Schools, skills, and synapses: working paper 14064. Cambridge, MA: National Bureau of Economic Research; 2008. http://www.nber.org/papers/w14064.pdf. Accessed February 16, 2009.
45. Perzel JM; Universities Children's Policy Collaborative, Legislative Office for Research Liaison. Early childhood education: universal pre-K and other alternatives. http://ecti.hbg.psu.edu/docs/publication/EDinPA_Spring%202006_0213_06.pdf#page=21. Published Spring 2006. Accessed March 2, 2009.
46. Barlow SE; Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007;120(suppl 4):S164-S192.