Development of a School Nutrition–Environment State Policy Classification System (SNESPCS)

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Background: As policy strategies are rapidly being developed to address childhood overweight, a system was developed to systematically and reliably classify state policies related to the school nutrition environment. This study describes the development process, the inter-rater reliability to code state policies enacted as of December 2003, and the variability in state policies related to the school nutrition environment.

Methods: The development of the School Nutrition Environment State Policy Classification System (SNESPCS) included a comprehensive review of published literature, reports from government and nongovernmental sources, input from an expert panel, and select experts. Baseline statutes and regulations for each of the 50 states and the District of Columbia were retrieved from Westlaw (data retrieved in 2005–2006 and analyzed in 2006) and pilot testing of the system was conducted.

Results: SNESPCS included 11 policy areas that relate to a range of environmental and surveillance domains. At baseline, states had no (advertising/promotion and preferential pricing) or modest (school meal environment, reimbursable school meals, coordinating or advisory councils, body mass index screening) activities in many of the policy areas. As of 2003, 60% of the states had policies related to the sale of foods in school that compete with the school meal program.

Conclusions: Evaluation of policies that affect the school-nutrition environment is in its earliest stage. SNESPCS provides a mechanism for assessing variation in state policies that can be incorporated in an evaluation framework aimed at elucidating the impact of state policies on the school environment, social norms, and children's dietary behaviors in schools.
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Data on the prevalence of overweight among children have triggered an interest in environmental and policy changes in the school setting. The rationale for developing and implementing school policies is emerging.[1] However, in recent years, much policy activity affecting the school nutrition environment has occurred at the federal, state, and local levels. As legislators have had success in developing public health policies in other areas (automobile, safety, and tobacco),[2] such strategies are increasingly being considered as an incentive to structure the school environment to support healthy behaviors. As children consume a significant proportion of their daily food intake in schools, the school environment is a prime target for nutrition-related policy initiatives.[1] To date, recommendations for policy changes in schools have been made based on "best-available" evidence and their effectiveness as it relates to school practices is just beginning to be evaluated.

The use of policy strategies to regulate the school nutrition environment is not new. For example, the nutritional content of meals sold as part of the National School Lunch Program (NSLP) and School Breakfast Program (SBP) is regulated at the federal level to conform to the United States Dietary Guidelines.[3] However, federal regulations are limited for foods and beverages sold outside the NSLP and SBP (termed competitive foods).[4,5] Only a portion of the competitive foods, those defined as Foods of Minimal Nutritional Value (FMNV) cannot be sold in school cafeterias or other food service areas during meal times.[6,7] However, it is well documented that students have easy access to

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competitive foods high in fat, sugar, and calories.[5,8] Currently, federal regulations allow states and local school authorities to further regulate the sale of competitive foods.

The Child Nutrition and Nutrition Program for Women, Infants, and Children (WIC) Reauthorization Act of 2004 is an example of a policy approach employed to change the school environment.[9] The Act required school districts that participate in the NSLP and SBP to implement "wellness" policies that include nutrition by school year 2006–2007. Recently, a number of soft drink companies have issued a joint statement with the Alliance for a Healthier Generation, the American Heart Association, and the Clinton Foundation to voluntarily adopt a new school beverage policy that will restrict the sale of soft drink in schools (e.g., increasing sales of bottled water, low-fat and nonfat milk, 100% fruit juice, and decreasing portion size).[10] Policy recommendations have been put forward by many, including the Institute of Medicine (IOM) which provides suggestions for competitive foods, school meals, nutrition education, advertising in schools, and assessment and reporting of body mass index (BMI) in schools.[1] If some or all of these policy recommendations are adopted and implemented, it is not yet clear what their impact will be on the school environment and children's behavior.

To assess the impact of policies, it is not sufficient to simply assess whether a policy exists given that the components and/or restrictions within a policy may vary greatly by state. From a policy-impact perspective, it is most useful to compare the variation in restrictions contained within a policy provision and to assess how the policy is being implemented in practice. Therefore, this paper describes the development of the School Nutrition Environment State Policy Classification System (SNESPCS), which was designed to classify and prospectively monitor changes in state statutes and regulations.

Methods

Data Source

Statutory (legislation) and administrative (regulatory) laws (collectively referred to as "policies" hereafter) for each of the 50 states and the District of Columbia (hereafter referred to as "states") were obtained via primary legal research[11] using the Westlaw legal database. State statutes reflect the official compilation of laws as enacted by state legislatures; administrative laws reflect the compilation of rules and regulations promulgated by state Executive Branch agencies.[12] Typically, state legislation in the school nutrition area provides an enabling framework or foundation for more detailed policy proscriptions that are specified in administrative laws (i.e., rules and regulations) developed by state agencies.[13] For this study, administrative laws were particularly relevant because most state education-related policies are formulated through the regulatory process. Information on case law, Attorney General opinions, Executive Orders, school district policies, and school-level policies was beyond the scope of this research.

Baseline data on state policies enacted or adopted as of December 31, 2003 were compiled to test the system. The baseline reference date was chosen to: (1) ensure consistency with the study reference date for a similar system created to assess state physical education (PE) policies (reported elsewhere)[14]; (2) serve as a baseline to prospectively assess change; and (3) establish a baseline before most changes occur in this area. The policy data were retrieved and analyzed in 2005–2006. A series of broadly defined Boolean search strategies were developed to identify potentially relevant policies contained in Westlaw. Secondary data source were used to cross-reference the existence of policies in a given topic area including: the School Nutrition Association's State Policy Index[15]; the Centers for Disease Control and Prevention (CDC)'s Nutrition and Physical Activity Legislative Database[16]; the National Conference of State Legislature's (NCSL) Health Promotion Program State Legislation and Statute Database[17,18]; the Health Policy Tracking Service[19]; and the National Association of State Boards of Education's (NASBE) State-Level School Health Policies Database.[20]

Conceptual Framework and Development of SNESPCS

A draft of SNESPCS was developed by the study team through a review of the published literature, web reports, policy recommendations from various health agencies, government recommendations and guidelines, model policies in this area, and key documents.[1,21–33] Development of SNESPCS was modeled after previous tobacco-related policy evaluation system that is used to classify policies against established public health benchmarks.[34,35] In contrast, empirical data is still emerging for the school nutrition environment; therefore, the policy areas and classifications within SNESPCS were based on "best possible" evidence as well as input from an expert panel (n=9) and key experts (n=4). The inclusion of a policy area in SNESPCS is not intended to imply that there is enough scientific evidence supporting such policy. SNESPCS topics focus on the competitive foods, the school meal environment, food service director qualifications, coordinating or advisory councils, nutrition education, marketing, and screening of body mass index (BMI) in schools.

As depicted in Figure 1, the topics included in SNESPCS can be viewed through the lens of the Social–Ecological Model[36,37] and more recently refined models presented by Brownson et al.[38] and Glanz et al.[39] The policy areas in SNESPCS can be classified according to whether they may affect the environment (physical, structural, communication, and economic environments) or the surveillance of BMI in schools with the rationale and scientific justification provided below.

Competitive foods. The term "competitive foods" in SNESPCS follows the U.S. Department of Agriculture (USDA) and Government Accounting Office (GAO) definition, which includes all foods and beverages sold outside of the reimbursable federal school meal programs.[4,5] In SNESPCS, coding is assigned in three categories: (1) à la carte in cafeterias, which include items sold or served in cafeterias, (2) vending machine items sold schoolwide, and (3) other

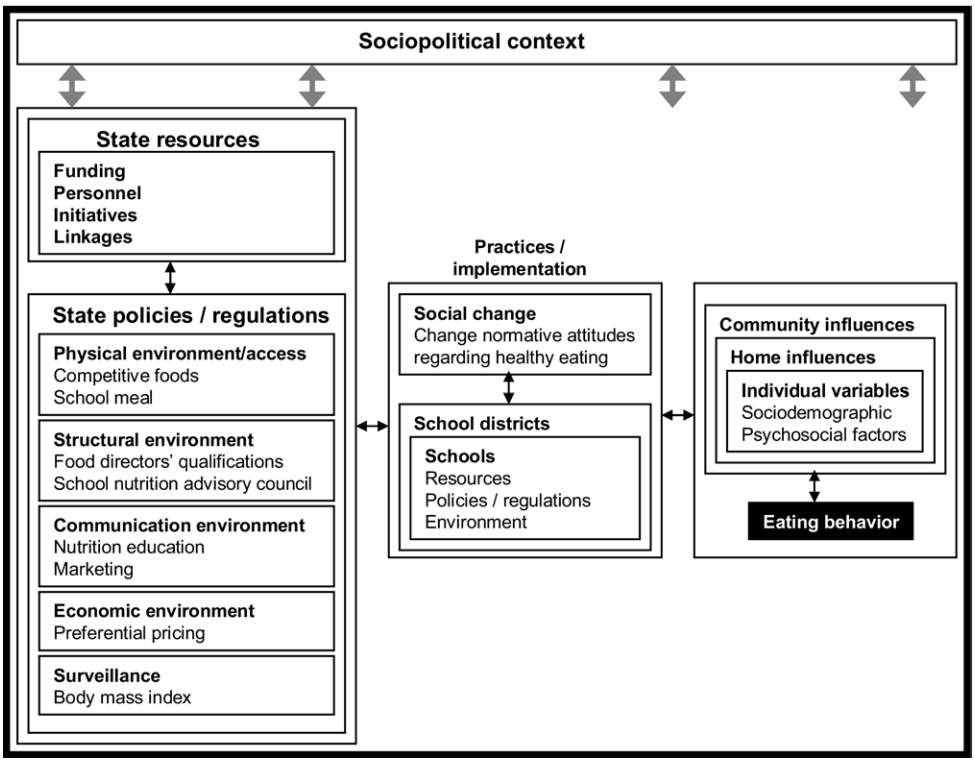

Figure 1. Conceptual framework for understanding the potential impact of policies related to the school nutrition environment.

venues that may include items sold or served in school stores, canteens, and classrooms. The limited number of studies that have examined the impact of competitive foods on children's dietary intake suggest that the availability of these foods is associated with higher intake of fat and saturated fat.[40–42] Federal regulations prohibit schools from selling foods of minimal nutritional value, but only in food service areas during meal times and applicable only to soda, water ices without fruit juice, several hard and soft candy types, and chewing gum.[6,7] SNESPCS includes provisions that go beyond meeting the federal regulation, in part because the definition of foods of minimal nutritional value is limited and does not capture many foods high in fat, sugar, and calories devoid of minerals and vitamins.[5–7] In addition, mid-range to higher codes differentiate among policies that meet or exceed the 2005 federal dietary guidelines.[43] It should be noted that SNESPCS includes less specificity for minimal requirements (e.g., maximum sugar allowance) than advocated by certain groups[44,45] and those identified by USDA as part of its HealthierUS School Challenge,[46] although additional specificity can be incorporated as further recommendations arise in this area.

School meals. Currently, schools participating in the SBP or NSLP are required to offer lunches between 10:00 AM and 2:00 PM, provide sufficient time to eat, and meet current USDA guidelines.[3,6,7] Some studies have indicated that the length of the lunch period is positively associated with improved nutrient intake.[47–49] In addition, those who consume the NSLP have been found to eat more fruits and vegetables[42] and have better nutrient intake.[50] For the SNESPCS, two categories were established, namely, the school environment, which refers to the time and duration of the meal period; and reimbursable school meals, which refers to enhancing the school meal preparation to exceed the 2005 federal dietary guidelines[43] (e.g., less fat than the federal guidelines).

Food service director qualifications. USDA and NASBE recommend setting educational standards for the nutrition personnel.[20,22] One large-scale survey found that credentialed food service managers prepared healthier food options than noncredentialed staff.[27] SNESPCS examines state policies with respect to the qualifications for newly hired food services directors.

Coordinating or advisory councils. Coordinating or advisory councils are created at the state level to build coordination and planning for school health needs[20] and may be linked to school wellness policies. Detailed suggestions for how a coordinating or advisory council relate to a statewide plan have been provided[51,52]; however, it was decided that SNESPCS would initially capture the extent to which states have developed such a framework. This category can be expanded to include more aspects as these state councils evolve.

Nutrition education. Nutrition education has been suggested to be an important component of a comprehensive health program[53] as it has the potential to increase students' knowledge about food choices and their attitudes and skills to eat a healthy diet.[54–56] It has been suggested that providing age-appropriate nutrition education in a school environment where healthy nutrition behavior is promoted can reinforce healthier food behaviors.[1]

Marketing. The American College of Preventive Medicine recommends prohibiting visual advertising, promotion, dis-

tribution, and sampling of "junk foods" on school property.[57] A recent IOM report concludes that there is enough empirical evidence suggesting that marketing practices have a significant impact on children's dietary behavior.[21] In addition, there is initial data indicating that lowering the price of healthier food options increase consumption of these items by children.[58–60] Consequently, SNESPCS includes two categories for marketing: (1) marketing–advertising, which refers to the promotion of food and beverages to student during school hours; and (2) marketing–preferential pricing, which refers to pricing strategies for selling healthier food and beverages options in the school.

Screening for BMI. The IOM has called for annual screening of every student's weight, height, and percentiled BMI as well as recommending that states develop reporting protocols.[1] Controversy about screening for BMI in schools and the reporting of BMI information is ongoing.[61–63] Although BMI screening is a controversial topic, the inclusion was deemed important as empirical evidence is likely to emerge after some states have enacted such policies. The decision to include BMI screening, or any other policy areas, in SNESPCS does not reflect the authors' or experts' endorsement of such policies but that such policies have been considered and enacted by some states.

Pilot testing and finalizing SNESPCS. The initial SNESPCS was reviewed by the expert panel (N=9; expertise in nutrition, education, policy, public health policies, obesity prevention, and nutrition guidelines). The expert panelists agreed on all policy topic areas, except for BMI school-based screening as mentioned above. Additionally, key experts provided focused advice on several iterations of SNESPCS and the associated topic areas. To finalize SNESPCS, a pilot study was conducted to determine the reliability of the system and to clarify decision rules. Eight states with the largest number of nutrition policies were selected for the pilot (DC, CA, DE, FL, LA, NE, OH, and WV). All policies were double coded independently (project manager and legislative analyst) and resulted in high inter-rater agreement (84.5%). The pilot resulted in minor changes and yielded a measurement system that reflected the 11 policy areas described above (see Appendix A). Where appropriate, policies were coded by grade level (elementary, middle, and high school). Grade level is not consistently defined by states; however, the states' operationalizations were employed for the classification. In total, 21 individual codes were developed (5 by grade level and 6 non–grade level = 5 * 3 grade levels + 6 = 21 codes).

Scoring. The SNESPCS is an ordinal scoring system, designed to reflect the relative degree of the policy mandate within each of the 11 policy areas, with scores within a given policy area ranging from "0" to a maximum of "3" or "6" points depending on the area. The "0" score across all topics reflects that a state has no policy and a score of "1" is assigned when a state made a policy recommendation (rather than a policy requirement). Inclusion of level "1" (recommended policy) scoring category was debated; however, an analysis of recommended policies may have research value as compared to mandated policies. Scores of "0" and "1" have consistent interpretation across all policy areas and scores in between reflect an increment in policy requirements and specificity. If a policy area was determined to be less varied in nature, the maximum score was set to a lower value ("3" versus "6") to reflect the limited range at this time (see Appendix A). A series of dichotomous subcodes were created to track policies areas that are not well developed in the literature but have the potential to enhance or inhibit the policy.

Analysis

Inter-rater agreement. Two raters with expertise in state legislative analysis independently rated each state's policies to assess the reliability of the codes. After the raters were trained in coding the policy areas, the reliability of SNESPCS was assessed by evaluating the percentage of agreement and the intraclass correlation coefficient (ICC).[64]

Policy area scores. Aggregate summary scores were computed for each of the 11 policy areas. For the five policy areas with grade-level scores (i.e., à la carte in cafeterias, vending machines, other venues, reimbursable school meals, and nutrition education) a category-specific score was computed by summing the elementary, middle, and high schools scores. In addition, across grade-level scores were computed to determine the lowest policy restriction that would apply across grade levels in the state. For example, states would receive a score of "at least 1" for à la carte in cafeterias if they received a score of "at least 1" across the three grade levels, as would a state that received a score of "4" at the high school level but only a score of "1" for another grade, indicative of the least extensive policy restriction that would apply for all grade levels. Composite scores were not developed as it was felt premature to assign weights both within the scoring categories as well as across policy areas since the empirical evidence is still emerging. All analyses were computed using SPSS version 14.0.1.

Results

Inter-rater Agreement

The percentage of agreement and ICC computations indicate adequate levels of inter-rater agreement. Inter-rater agreement ranged from a low of 74.5% (for nutrition education scores) to perfect agreement (for the marketing–preferential pricing policy area), with an average inter-rater agreement of 88.8%. Disagreement for the nutrition education area centered on the subtle difference between a policy mandating nutrition education standards without specific requirements and one that specified requirements for knowledge, skills, and behavior. ICCs were not computed for seven of the items as not enough policies existed in these areas. The ICCs were fairly high—ranging from a low of 0.835 (nutrition education for elementary schools) to a high of 0.962 (competitive foods in other venues for elementary schools). The average ICC was fairly high, 0.902, indicative of the reliability of SNESPCS.

Policy Area Scores

Summary statistics are presented in Table 1 with grade-level scores presented in Table 2. State-level data (summed across grades by policy areas) are presented

Table 1. Policy-area descriptive statistics, without grade distinctions (as of December 31, 2003)

				Without grade distinctions				
Policy area	**Brief description**	**Grade-level scores**	**Maximum attainable score per grade**	**Maximum attainable score across grades**	**# of states with scores >0 N (%)[a]**	**Low–high scores achieved**	**Mean**	**SD**
Competitive foods à la carte in cafeterias	Individual food items sold or served outside the federal school meal program	Yes	5	15	14 (27.5)	0–15	2.37	4.43
Competitive foods—vending machine	Individual food items sold or served through vending machines in schools	Yes	6	18	17 (33.3)	0–12	2.33	3.73
Competitive foods: other venues	Individual food items sold or served outside the cafeteria or vending machines	Yes	6	18	17 (33.3)	0–12	2.29	3.66
Reimbursable school meal	Exceeding federal requirements for the reimbursable school meal	Yes	3	9	3 (5.9)	0–9	0.41	1.80
School meal environment	Exceeding federal requirements for meal time and meal period	No	3	3	3 (5.9)	0–3	0.10	0.46
Food service director qualifications	Qualification for newly hired food service directors	No	4	4	8 (15.7)	0–4	0.49	1.19
Coordinating or advisory councils	Creation of council or plan	No	3	3	8 (15.7)	0–2	0.24	0.59
Nutrition education	Requirements for the nutrition education curriculum	Yes	4	12	30 (59.8)	0–12	4.49	4.29
Marketing: advertising	Promotion of food and beverages during school hours	No	5	5	0 (0.0)	0–0	0.00	0.00
Marketing: preferential pricing	Preferential pricing for selling healthier food in school	No	4	4	0 (0.0)	0–0	0.00	0.00
BMI screening	BMI screening and reporting	No	3	3	3 (5.9)	0–3	0.18	0.71

[a]The column, "# of states with scores >0" reflect the aggregate scores without grade-level distinctions.
SD, standard deviation; BMI, body mass index.

in Appendix B with more detailed data available on request. Overall, 38 states (74.5%) received a score greater than "0". Policy activity as of December 31, 2003 was limited to a few areas—competitive foods (à la carte in cafeterias, vending machines, and other venues; nutrition education; and, to a lesser extent, coordinating or advisory councils and food service directors. With the exception of nutrition education, where 30 states had taken some type of action, the summary scores and statistics across the policy areas were quite low.

Competitive foods (à la carte in cafeterias, vending machines, and other venues). The scores for à la carte in cafeterias were somewhat higher than the vending machines and other venues scores and between 14 (27.5%) to 17 (33.3%) states received a score in these policy areas (see Table 1). Fewer states received a score of at least "1" for each of the three grade levels; 12 (13.5%) states for the à la carte sales; ten (19.6%) states for vending machines; and 11 (21.6%) for other venues (see Table 2). The maximum score was attained only for the à la carte sales and only three were given "full credit" for meeting the maximum score "5", which prohibited à la carte sales or service in cafeterias outside the reimbursable school meal program with some exceptions (e.g., sale of water, low-fat/nonfat milk, beverages with at least 100% fruit/vegetable juice, and nonfat fruits and vegetables).Overall higher scores were more prevalent for elementary schools followed by middle and high schools (see Table 2). Only one state

Table 2. Descriptive statistics for policy areas with grade-level distinctions (as of December 31, 2003)

		Elementary school		Middle school		High school		Aggregate all grade		
Policy area	**Score**	**N**	**%**	**n**	**%**	**n**	**%**	**Score**	**n**	**%**
Competitive foods—à la carte in cafeterias	0	37	72.5	39	76.5	39	76.5	Some 0	39	76.5
	1	0	0.0	0	0.0	0	0.0	At least all 1	0	0.0
	2	5	9.8	6	11.8	6	11.8	At least all 2	6	11.8
	3	3	5.9	2	3.9	2	3.9	At least all 3	2	3.9
	4	2	3.9	1	2.0	1	2.0	At least all 4	1	2.0
	5	4	7.8	3	5.9	3	5.9	All 5	3	5.9
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum		5		5		5			
	Mean (SD)		0.92 (1.65)		0.73 (1.46)		0.73 (1.46)			
	Tracking variable: portion size[a]	0	0.0	0	0.0	0	0.0			
	Tracking: penalty[a]	1	2.0	1	2.0	1	2.0			
Competitive foods: vending machines	0	35	68.6	38	74.5	40	78.4	Some 0	41	80.4
	1	0	0.0	0	0.0	1	2.0	At least all 1	0	0.0
	2	3	5.9	4	7.8	4	7.8	At least all 2	4	7.8
	3	8	15.7	7	13.7	6	11.8	At least all 3	6	11.8
	4	2	3.9	2	3.9	0	0.0	At least all 4	0	0.0
	5	1	2.0	0	0.0	0	0.0	At least all 5	0	0.0
	6	2	3.9	0	0.0	0	0.0	All 6	0	0.0
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum		6		6		6			
	Mean (Std. Dev.)		1.08 (1.75)		0.73 (1.30)		0.53 (1.07)			
	Tracking variable: portion size[a]	0	0.0	0	0.0	0	0.0			
	Tracking penalty[a]	1	2.0	1	2.0	1	2.0			
Competitive foods: other venues	0	35	68.6	38	74.5	39	76.5	Some 0	40	78.4
	1	0	0.0	0	0.0	1	2.0	At least all 1	0	0.0
	2	4	7.8	4	7.8	4	7.8	At least all 2	4	7.8
	3	8	15.7	7	13.7	7	13.7	At least all 3	7	13.7
	4	3	5.9	2	3.9	0	0.0	At least all 4	0	0.0
	5	0	0.0	0	0.0	0	0.0	At least 5	0	0.0
	6	1	2.0	0	0.0	0	0.0	All 6	0	0.0
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum		6		6		6			
	Mean (SD)		0.98 (1.57)		0.73 (1.30)		0.53 (1.12)			
	Tracking variable: portion size[a]	0	0.0	0	0.0	0	0.0			
	Tracking penalty[a]	1	2.0	1	2.0	1	2.0			
Reimbursable school meals	0	48	94.1	48	94.1	48	94.1	Some 0	48	94.1
	1	1	2.0	1	2.0	1	2.0	At least all 1	1	2.0
	2	0	0.0	0	0.0	0	0.0	At least all 2	0	.0
	3	2	3.9	2	3.9	2	3.9	All 3	2	3.9
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum		3		3		3			
	Mean (SD)		0.14 (0.60)		0.14 (0.60)		0.14 (0.60)			
Nutrition education	0	22	43.1	22	43.1	21	41.2	Some 0	22	43.1
	1	2	3.9	2	3.9	1	2.0	At least all 1	2	3.9
	2	13	25.5	14	27.5	15	29.4	At least all 2	14	27.5
	3	8	15.7	8	15.7	8	15.7	At least all 3	8	15.7
	4	6	11.8	5	9.8	6	11.8	All 4	5	9.8
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum		4		4					
	Mean (SD)		1.49 (1.48)		1.45 (1.43)		1.55 (1.46)			
	Tracking variable: curriculum integration[a]	7	13.7	7	13.7	6	11.8			
	Tracking variable: instruction[a]	0	0.0	0	0.0	0	0.0			

[a]Tracking variables are not part of the scoring system but are monitored as these variables may have the potential to influence the measurement system.
SD, standard deviation.

received credit (see tracking variables in Table 2) at each grade level for establishing penalties for violations of the state law and this was consistent across the à la carte, vending machines, and other venues sale of competitive foods. In addition, no state addressed portion sizes of food sold à la carte, in vending machines, and other venues.

Reimbursable school meals. Only three states (5.9%) had policies governing reimbursable school meals (Table 1). As Table 2 reveals, two states (3.9%) were given the maximum score of "3" for each grade levels as they specified requirements for exceeding compliance with the 2005 federal regulations.[6,7] One state recommended (score of "1") nutrition standards to exceed compliance with the federal regulations for school meals.

School meal environment. As with the reimbursable school meal area, only three states (5.9%) had a relevant policy for the school meal environment that exceeded compliance with the 2005 federal regulations in this area.[43] Notably, two of the three state policies were limited to a recommendation (score of "1") and the remaining state received a score of "3" for mandating at least two standards beyond the federal requirements.

Food service director qualifications. Eight states (15.7%) included at least a minimal qualification requirement (score of "2") for newly hired food service directors (Table 1). Two states included a minimal requirement of a high school degree/GED (score of "2"), three states required a minor (score of "3"), and three states received the maximum score "4" for requiring a bachelor's degree in nutrition, dietetics, food service management or a related field. Six states' policies (11.8%) included a provision for professional development of food service directors, regardless of whether it was related to the certification.

Coordinating or advisory councils. Eight states (15.7%) recommended the establishment of at least voluntary school health coordinating or advisory councils for districts or schools (Table 1). Four states included this minimal recommendation, while the other four had a minimal requirement ("2") for the creation of such councils or programs. Five states (9.8%) included a provision requiring the state to create an advisory board to provide recommendations related to nutrition and youth overweight policies.

Nutrition education. As Tables 1 and 2 indicate, state policies were more likely to address the nutrition education area than any other category included in SNESPCS. Across grade levels, most states (30 states, 59.8%) had at least a minimal policy provision and 29 states (56.9%) included at least a recommendation (score of "1"). Five states (9.8%) received the maximum score "4" across grade levels for requiring a curriculum to incorporate sequential nutrition education content into the standard health education curriculum with reference to specific nutrition standards. Seven states policies (13.7%) included requirements for integrating the nutrition instruction in the school with the food service program or with other subjects at the elementary and middle school levels; six states (11.8%) included such provision for high schools. No state policy specified a set or minimal amount of hours for nutrition education or hours of professional development for nutrition educators.

Advertising/marketing. Although included in SNESPCS, no state policies addressed either the advertising/promotion or the preferential pricing areas (see Table 1).

Screening for BMI. Three states' policies (5.9%) were given credit for addressing BMI screening (Table 1). In each case, the states were given maximum credit ("3") for mandating that schools perform annual BMI screening of all students (as long as they were not exempted by parents). One state included a provision that the state and/or school district addressed procedures for parental notification and referral.

Discussion

Understanding the relationship between school nutrition policies with the school nutrition environment, social norms, and student dietary behavior is a topic of great interest. For evaluation purposes, a monitoring system that facilitates classification of school nutrition policies both within and across states is an important preliminary step. This paper described the methodology to monitor and classify state policies that have the potential to affect the school nutrition environment and to provide an initial baseline for ongoing policy evaluation. The SNESCPS will help states monitor change over time and will provide a reliable system which can be incorporated in evaluation research focused at elucidating the impact of these policies.

Baseline data reported herein demonstrate that SNESPCS can be used to reliably classify state policies addressing the school nutrition environment, a key criterion of any measurement system.[65] As of December 31, 2003, policies in most states focused on the following areas from our conceptual framework: the physical environment (i.e., competitive foods and school meal policies), communication environment (particularly nutrition education) and, to a lesser extent, on the structural environment (i.e., food service director qualifications and school nutrition advisory councils). Few states policies addressed the economic environment or surveillance issues. It was not surprising that nutrition education received the most attention thus far, since it is integrated into the health education curriculum, a component that is commonly taught in schools. Con-

versely, the other components assessed by the system are not part of the school curriculum and may have received less attention given the increased focused on student achievement.[66] Furthermore, the relatively small number of state policies targeting the school nutrition environment may reflect that: (1) the policy focus in this area is emerging; (2) states deferred to local authorities on school-related policies; and (3) state policymakers are wary of restrictions on competitive foods sales and other restrictions that might create financial challenges for schools since competitive foods revenues are used to subsidize food service operations, field trips, and athletic equipment and facilities.[5] Plans are underway to update the data and to make it available on the National Cancer Institute (NCI) website.

A major strength of SNESPCS is that it was designed to capture the variation in state-level policies governing the school nutrition environment that extend beyond simply assessing the presence or absence of policies in a given area. It is meant to serve as a starting point for surveillance and to be incorporated in a comprehensive evaluation framework (see Figure 1). As such it addresses an important need for evaluation research in this area, which IOM has identified as an important focus for obesity prevention.[67] A rigorous process was used to develop SNESPCS; however, much is still needed to be done to establish its validity and develop composite scores. As the empirical evidence continues to emerge across policy areas, SNESPCS should not be viewed as a report card on school nutrition environment policies of individual states.

Recognizing that the system is in its infancy, it is important to review this paper and the system within the context of the following limitations. First, only statutes and regulations were assessed. Thus, a range of obesity-related programs and interventions as well as industry agreements were not reflected in this study. Second, local school district policies addressing nutrition may be more extensive than what is required by state law and although local school district policies were analyzed as part of the development process, the applicability of SNESPCS for assessing local-level policies has not been fully assessed. Third, the passage of a policy is an important first step; however, it does not necessarily mean that the policy was enforced. SNEPCS does not track enforcement as it does not provide an evaluation of the implementation of these policies, although the resulting data can be linked to both programs and practices. Fourth, as more empirical data or recommendations (such as the IOM report on nutrition standards for foods in school[68]) emerge, the categories and the scoring structure within SNESPCS may need to be refined to ensure that the system accurately reflects new evidence and captures the policy variance both within and across categories. Finally, psychometric analyses are warranted to assess the performance of the system in relation to the hypothesized understanding of the policy components.[65]

With these limitations in mind, the development of SNESPCS is particularly timely given the interest in policies enacted to respond to the childhood overweight epidemic. Combining SNESPCS with the PE policy system[14] provides data, beginning with a 2003 baseline, on the variability of a range of policies which have an impact in structuring school environments to support healthy behaviors. Linking the policy data with other data has significant potential for understanding how these policies affect the school environment, and potentially social norms and behavioral outcomes among children as similar efforts have been successful in helping understand the impact of tobacco consumption and related behaviors.[69–71] Furthermore, combining the knowledge of school policy influences with measures of home, neighborhood, media, and other influences can provide a more comprehensive understanding of children's dietary behaviors.

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Appendix A: School nutrition environment state policy classification system for elementary (ES), middle (MS), and high (HS) schools

Terminology	Definition
Competitive foods	USDA and GAO defined to include all foods and beverages sold outside of the reimbursable federal school meal program.[4,5]
Federal dietary guidelines	2005 federal dietary guidelines that recommend total fat intake of less than 35% of calories (saturated fat at less than 10% of calories) for ages 4 to 18; little added sugars or caloric sweeteners, and consumption of fiber rich fruit, vegetables and whole grains and nonfat dairy foods.[43]
Food of minimal nutritional value (FMNV)	Includes carbonated beverages, water ices, chewing gum, hard candy, jellies and gums, marshmallow candies, fondant, licorice, spun candy, and candy-coated popcorn (7 CFR 210 Appendix B).[6,7]
Food and beverages of low nutritive value	Food and beverages providing most of its calories from fat and/or sugar and few vitamins and minerals.

Score	Description
Competitive Foods: à la carte in cafeterias	
5	ES/MS/HS: State prohibits the sale or service of à la cart food and beverages outside the reimbursable school meal programs, with exceptions only for the sale or service of water, lowfat/nonfat milk, beverages with at least 100% fruit/vegetable juice with no added caloric sweeteners, and nonfried fruit and vegetables.
4	ES/MS/HS: State mandates nutrition standards that meet or exceed federal dietary guidelines,[43] with specified limits on fats and added sugar and requirement(s) for nutrient-dense options, applicable to all à la carte food and beverage items sold or served in cafeterias outside the school meal program.
3	ES/MS/HS: State restricts sale/service of à la carte food and beverages of low nutritive value beyond federal requirements for FMNV, but without establishing nutrition standards that meet or exceed federal dietary guidelines.[43]
2	ES/MS/HS: State requirement for à la carte food and beverages sold or served in cafeterias outside the school meal program is undefined (e.g., "healthy" foods and beverages must be available); or state requires a state agency to develop and adopt nutrition standards applicable to à la carte sales/service.
1	ES/MS/HS: State recommends nutrition standards for à la carte items.
0	ES/MS/HS: No provision.
Tracking variable	**Potential enhancement factor:** Applies if state specifies portion sizes. **Potential enhancement factor:** Applies if penalties are established for violations.
Competitive foods: vending machines	
6	ES/MS/HS: State prohibits the sale or service of nonreimbursable food and beverages in vending machines (or student access to vending machines selling such items), with exceptions only for the sale or service of water, lowfat/nonfat milk, beverages with at least 100% fruit/vegetable juice with no added caloric sweeteners, and nonfried fruit and vegetables.
5	ES/MS/HS: State mandates nutrition standards that meet or exceed federal dietary guidelines,[43] with specific limits on fats and added sugar and specific requirement(s) for nutrient-dense options, applicable to all food and beverage items sold or served outside the school meal program in vending machines (or access to such vended items).
4	ES/MS/HS: State prohibits, at any time during school hours (beyond meal service times in the cafeteria), vending (or access to vending) of FMNV, including, but not limited to, carbonated beverages (e.g., no vending-machine soda during school hours).
3	ES/MS/HS: State mandates a restriction on vending-machine food/beverages of low nutritive value beyond federal requirements for FMNV, but for fewer than all school hours.
2	ES/MS/HS: State requirement for food and beverages sold/served in vending machines outside the school meal program is undefined (e.g., "healthy" foods and beverages must be available); or state requires the development of nutrition standards applicable to vending machines sales/service.
1	ES/MS/HS: State recommends nutrition standards for vended items.
0	ES/MS/HS: No provision.
Tracking variables	**Potential enhancement factor:** Applies if State specifies portion sizes for vended items. **Potential enhancement factor:** Applies if penalties are established for violations.
Competitive foods: Other venues	
6	ES/MS/HS: State prohibits the sale or service of nonvending-machine food and beverages sold or served outside of (reimbursable) school meal programs, with exceptions only for the sale or service of water, lowfat/nonfat milk, beverages with at least 100% fruit/vegetable juice with no added caloric sweeteners, and nonfried fruit and vegetables.
5	ES/MS/HS: State mandates nutrition standards that meet or exceed federal dietary guidelines,[43] with specific limits on fats and added sugar and specific requirement(s) for nutrient-dense options, applicable to all food and beverage items sold or served outside the school meal program in any nonvending-machine setting (i.e., school stores/canteens/snack bars, fundraisers, and classrooms).

Score	Description
4	ES/MS/HS: State prohibits, at any time during school hours (beyond meal service times in the cafeteria), nonvending-machine sales or service food or beverages of FMNVs, including, but not limited to, carbonated beverages.
3	ES/MS/HS: State mandates a restriction on sales or service of food/beverages of low nutritive value in settings that include, but are not limited to, stores/canteens/snack bars, applicable beyond federal requirements for FMNV, but for fewer than all school hours.
2	ES/MS/HS: State requirement for nonvending-machine food and beverages sold/served outside the school meal program is undefined (e.g., "healthy" foods and beverages must be available); or state requires a state agency to develop and adopt nutrition standards applicable to nonvended settings.
1	ES/MS/HS: State recommends or offers voluntary guidelines for nonvended food/beverages sold outside the school meal program.
0	ES/MS/HS: No provision.
Tracking variables	**Potential enhancement factor:** Applies if state specifies portion sizes. **Potential enhancement factor:** Applies if penalties are established for violations.
Reimbursable school meals	
3	ES/MS/HS: State addresses nutrition in (reimbursable) school meal programs with specific requirements or standards that exceed compliance with federal regulations for school meals (7 CFR 210 for the National School Lunch Program and 7 CFR 220 for the School Breakfast Program) (e.g., state prohibits deep-fried foods in school meals and requires school menus to include nutritional information).
2	ES/MS/HS: State addresses nutrition in (reimbursable) school meal programs with a general mandate to develop and adopt requirements or standards that exceed compliance with federal regulations (e.g., State Board of Education is required to establish nutrition standards for all food and beverages sold or served in schools, including school nutrition programs).
1	ES/MS/HS: State recommends nutrition standards for school meals that exceed compliance with federal regulations.
0	ES/MS/HS: No provision.
School meal environment	
3	State mandates two standards (beyond the school meal federal requirements)[6,7] for designated meal periods, in categories such as: (1) specific meal scheduling time requirements (e.g., lunch must be served between 11 AM and 1 PM and/or lunch must follow recess), and (2) specific eating time requirements (e.g., school must provide 20 minutes for students to eat after students are seated).
2	State mandates one standard (beyond the school meal federal requirements)[6,7] for designated meal period, in categories such as: (1) specific meal scheduling time requirements (e.g., lunch must be served between 11 AM and 1 PM), and/or (2) specific eating time requirements (e.g., school must provide 20 minutes for students to eat after students are seated).
1	State recommends requirements for designated meal periods that exceed compliance with federal regulations for the school meal.
0	No provision.
Food service director qualifications	
4	State requires newly hired district food service directors to have a minimum of a bachelor's degree in nutrition, dietetics, food service management (or related field) or certification/credentialing from either a state or national program (e.g., American School Food Service Association or American Dietetic Association) at a level that specifies a post-secondary degree and a minimum requirement for specialized training in a nutrition-related field.
3	State requires newly hired food service directors to have a minor in a nutrition, dietetics, food service management (or related field) or certification/credentialing that specifies a post-secondary degree (e.g., associate's degree) and a minimum requirement for specialized training in a nutrition-related field.
2	State requires newly hired district food service directors to have a high school degree/GED and, in addition, a minimum requirement for specialized training in a nutrition-related field; or state requires certification/credentialing that specifies a HS/GED degree with a minimum requirement for specialized training in a nutrition-related field.
1	State recommends credentials for food service directors (or State certification is voluntary).
0	No provision.
Tracking variable	**Potential enhancement factor:** Applies if state addresses professional development for food service directors, whether related to certification or otherwise.
Coordinating or advisory councils	
3	State mandates that districts or schools form school health coordinating or advisory councils that include a nutrition component (e.g., Coordinated School Health Program [CSHP]), whether linked to local wellness policies required by the federal Child Nutrition and WIC Reauthorization Act of 2004 (P.L. 108-265 section 204) or otherwise establishes a statewide infrastructure to support such programs.

Score	Description
2	State mandates that districts or schools form school health coordinating or advisory councils (e.g., Coordinated School Health Program [CSHP]), whether linked to local wellness policies required by the federal "Child Nutrition and WIC Reauthorization Act of 2004" or otherwise.
1	State recommends voluntary coordinating or advisory councils for districts or schools.
0	No provision.
Tracking variable	**Potential enhancement factor:** Applies if state creates a board/commission/committee to provide advice and recommendations related to nutrition and youth overweight policies.
Nutrition education	
4	ES/MS/HS: State requires a curriculum to incorporate/integrate sequential nutrition education content into standards-based health education curriculum with reference to specific nutrition standards.
3	ES/MS/HS: State requires a curriculum to incorporate/integrate sequential nutrition education content into standards-based health education curriculum without reference to specific nutrition standards.
2	ES/MS/HS: State requires a curriculum to incorporate nutrition education content into health curriculum without reference to any additional requirements.
1	ES/MS/HS: State recommends nutrition education content.
0	ES/MS/HS: No provision.
Tracking variables	**Potential enhancement factor:** Applies if state specifies that schools must integrate/coordinate nutrition instruction in the school with the food service program and/or instruction in other subjects. **Potential enhancement factor:** Applies if state specifies hours of student instruction per year (e.g., 50 hours per year) and/or hours of nutrition education professional development (e.g., 10 hours per year).
Marketing: advertising	
5	State mandates the promotion of noncommercial healthy school nutrition information/activities and prohibits commercial advertising/promotion of food and beverages that do not conform to specified nutrition standards that meet or exceed federal dietary guidelines.[43]
4	State prohibits commercial advertising/promotion of all food and beverages that do not conform to specified nutrition standards that meet or exceed federal dietary guidelines.[43]
3	State limits commercial advertising/promotion for low-nutrient food and beverages in certain locations and/or at certain times (e.g., direct advertising, such as a requirement to switch vending machine signage for soda to signage for water; or indirect advertising, such as a ban on providing FMNVs[43] and all forms of candy as a free promotion).
2	State requirement for advertising/marketing is undefined (e.g., schools must promote "healthy" food choices and prohibit advertising/marketing of "less healthy" food and beverages); or state requires districts or schools to develop and adopt a standard for commercial advertising/promotion of food or beverages. State prohibits all advertising associated with instruction.
1	State recommends a standard for nutrition-based marketing of food and beverages to students during the school day.
0	No provision.
Tracking variables	**Potential enhancement factor:** Applies if a state addresses the use of commercial food products (through coupon, incentives or other means) as a reward for school achievement. **Potential inhibiting factor:** Applies if a state explicitly permits commercial advertising/promotion for food and beverages that may not conform to the federal dietary guidelines[43] (e.g. State permits commercial advertisement on protective book covers).
Marketing: preferential pricing	
4	State mandates preferential pricing, applicable to multiple settings, to promote nutrient-dense food or beverages choices (e.g., preferential pricing of fruits and vegetables wherever sold or served in school).
3	State mandates preferential pricing, applicable to a single setting or food group to promote nutrient-dense food or beverages choices (e.g., vending prices may not favor carbonated beverages over water or 100% fruit juice).
2	State mandates a general requirement for preferential pricing (e.g., districts or schools shall promote healthy foods through preferential pricing); or State requires districts or schools to develop and adopt a policy related to preferential pricing for nutrient-dense food and beverages,
1	State recommends preferential pricing to promote nutrient-dense food or beverage choices.
0	No provision.
Tracking variable	**Potential enhancement factor:** Applies if State addresses placement of food or beverages to promote nutrient-dense food and beverage choices* (e.g., fruits and vegetables should be offered at all points of service).
Body mass index (BMI) screening	
3	State mandates that schools perform annual BMI screening of all students (if not exempted by parents).
2	State mandates that schools perform BMI screening of students in fewer than all grade levels (if not exempted by parents).

Score	Description
1	State recommends or explicitly permits student screening for BMI.
0	No provision.
Tracking variables	**Potential enhancement factor:** Applies if state addresses required procedures for BMI screening (e.g., State requires schools to develop rules for screening, including use of CDC's EPI-info computer program). **Potential enhancement factor:** Applies if State addresses required procedures for notification to parents and referral (e.g., State requires schools to develop rules to ensure confidentiality/privacy and referrals to healthcare system). **Potential enhancement factor:** Applies if statewide agency is authorized to establish a surveillance system to track childhood overweight data.

Appendix B: State-level data aggregated across grade levels as of December 31 2003*

	Competitive foods			Reimbursable school meals					
State	À la carte in cafeterias	Vending machines	Other venue	Reimbursable school meals	School meal environment	Food service director qualifications	Coordinating/ advisory council	Nutrition education	BMI screening
AK	0	0	0	0	0	0	0	0	0
AL	0	0	0	0	0	4	0	0	0
AR	6	10	6	0	0	0	2	6	3
AZ	0	0	0	0	0	0	0	0	0
CA	4	9	8	3	0	0	0	6	0
CO	0	6	9	0	0	0	0	0	0
CT	9	9	9	9	0	0	0	4	0
DC	0	0	0	0	0	0	0	6	0
DE	6	6	6	0	0	0	0	6	0
FL	9	12	12	0	0	0	0	0	0
GA	0	3	3	0	0	3	0	4	0
HI	0	0	0	0	0	0	0	0	0
IA	0	0	0	0	0	0	0	4	0
ID	0	0	0	0	0	0	0	8	0
IL	3	3	3	0	0	0	0	4	0
IN	0	0	0	0	0	0	0	4	0
KS	0	0	0	0	0	0	0	0	0
KY	15	9	9	0	0	0	0	0	0
LA	15	9	9	0	1	4	0	4	0
MA	0	0	0	0	0	0	0	0	3
MD	0	0	0	0	0	0	2	8	0
ME	15	6	6	0	0	0	0	6	0
MI	0	0	0	0	0	0	0	4	0
MN	0	0	0	0	0	0	0	0	0
MO	0	0	0	0	0	0	0	0	0
MS	6	9	9	0	0	4	1	2	0
MT	0	0	0	0	0	0	0	6	0
NC	6	4	4	0	0	0	0	0	0
ND	0	0	0	0	0	2	0	0	0
NE	0	0	0	0	0	0	0	4	0
NH	0	0	0	0	0	0	0	4	0
NJ	0	0	0	0	0	0	0	0	0
NM	0	0	0	0	0	0	0	2	0
NV	0	0	0	0	0	0	0	8	0
NY	0	9	9	0	0	0	0	4	0
OH	6	6	6	0	0	0	0	4	0
OK	0	0	0	0	0	0	0	6	0
OR	0	0	0	0	0	0	0	0	0
PA	0	0	0	0	0	0	1	4	3
RI	0	0	0	0	0	2	0	6	0
SC	0	0	0	0	0	0	0	6	0
SD	0	0	0	0	0	0	0	0	0
TN	0	0	0	0	0	3	1	0	0
TX	0	0	0	0	0	0	2	8	0
UT	0	0	0	0	0	0	0	0	0
VA	9	1	1	0	1	0	2	4	0
VT	0	0	0	0	0	0	1	0	0

State	Competitive foods			Reimbursable school meals		Food service director qualifications	Coordinating/ advisory council	Nutrition education	BMI screening
	À la carte in cafeterias	Vending machines	Other venue	Reimbursable school meals	School meal environment				
WA	0	0	0	0	0	0	0	0	0
WI	0	0	0	0	0	0	0	0	0
WV	12	8	8	9	3	3	0	8	0
WY	0	0	0	0	0	0	0	0	0

*Data for marketing—advertising and—preferential pricing not shown as there are no policies in this area.