Development of a Physical Education–Related State Policy Classification System (PERSPCS)

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Background: As policy-based approaches are increasingly proposed to address childhood obesity, this paper seeks to: (1) present the development of a system to systematically and reliably assess the nature and extent of state physical education (PE) and recess-related policies; (2) determine the inter-rater agreement in using the system; and (3) report on the variability in state policies using a December 31, 2003 baseline.

Methods: The PE and Recess State Policy Classification System (PERSPCS) was developed from a conceptual framework and was informed by reviewing the scientific and gray literatures and through consultations with an expert panel and key experts. Statutes and regulations enacted as of December 31, 2003 were retrieved from Westlaw (data retrieved and analyzed in 2004–2005).

Results: PERSPCS addresses five areas: PE time requirements, staffing requirements for PE, curriculum standards for PE, assessment of health-related fitness, and recess time (elementary schools only). The inter-rater agreement ranged from 0.876 (PE staffing requirements) to perfect agreement (recess time). Staffing requirements had more restrictive policies, followed in decreasing order by time requirements, curriculum standards, assessment, and recess time. Overall, state policies met minimal requirements across areas and grade levels as of December 2003.

Conclusions: Extending PERSPCS to address other aspects of childhood obesity is a critical first step in understanding the range of state policy approaches in this area and their impact. PERSPCS should be examined in conjunction with school district–level policies to determine the overall effects of policies on school environmental and behavioral outcomes. PERSPCS is not designed to set policy guidelines.

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Introduction

In many industrialized nations, the prevalence of childhood obesity is increasing at an alarming rate.[1–3] Currently, there is a strong consensus that policy-based approaches targeting the school environment may have the greatest population-level impact on childhood obesity. This is due primarily to the fact that such approaches can reach most children and because children consume one third of their daily caloric intake and spend 50% of their energy expenditure in schools.[2,4,5] As many public health accomplishments (e.g., reduction of motor vehicle and firearm injury; lowering of dental caries through water supply fluoridation; tobacco control) have been attributed to policy change,[6,7] a broad spectrum of school-based policies already have been proposed to address childhood obesity (e.g., eliminating vending machines in schools, increasing time spent in physical education [PE]). Both nutrition and physical activity policies have been proposed, as it is recognized that obesity, for the majority of children, results from an imbalance in calorie consumption and/or lack of physical activity.[2] Currently, there is a need to develop a system to systematically and reliably classify the breadth and depth of these policies across states to facilitate environmental and systems-level evaluations that relate to childhood obesity.

Increasing physical activity opportunities during school hours is one area that has been targeted by policy-based approaches. Such strategies may target the PE program and/or recess time (for children in elementary school only). Results from a recent systematic review suggest that having adequate instruction time

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and modifying the curriculum to increase the amount of time children are active in PE results in a significant increase in fitness among school-aged children.[8] While the systematic review had mixed results for body mass index (BMI), more recent studies have found that increased time spent in PE was associated with a decrease in BMI.[9,10] In addition, the literature suggests that both the qualifications of the PE teachers and increasing time spent being physically active during PE are key factors for increasing physical activity behavior.[11–13] Establishing content standards (e.g., increasing knowledge, attitudes, skills, behaviors, self-efficacy) for the PE curriculum is expected to be important for increasing time spent active during PE and considered to be a prerequisite for increasing physical activity in school. Regular assessment can serve to monitor and reinforce student learning in PE and can include the assessment of knowledge, skills, and health-related fitness. Although regular assessment of PE has not been linked to behavior change, the need for regular evaluation of PE programs appears to be well supported for improving their quality.[14–17] Finally, outside of the PE program, recess can provide spontaneous opportunities for elementary school children to be active. At this time, it remains unclear what the impact of increasing recess time alone will have on behavior, but it appears that combining an increase in recess time with access to physical activity games or equipment may hold promise in increasing physical activity among that age group.[13,18]

Evidence to formulate model policies for specific physical activity options in school, including PE and recess, is still emerging. A number of recommendations have, however, been put forward by various organizations (Action for Healthy Kids, American Academy of Pediatrics, the Centers for Disease Control and Prevention [CDC], National Association for Sport and Physical Education [NASPE], National Association of State Boards of Education [NASBE], U.S. Department of Health and Human Services [DHHS], as well as others).[8,14–17,19–21] These recommendations address all or some aspects of what NASPE and CDC define as a quality PE program: (1) adequate instruction time, (2) qualified staff, (3) meaningful content standards, and (4) regular assessment.[14,15] In addition, providing adequate recess time for elementary school children is recommended by NASPE and CDC.[14,15] Recognizing the need to understand the impact of PE and recess time policies on physical activity behavior during school, the purpose of this paper is to: (1) describe the development of a system for systematically and reliably classifying the breadth and depth of state statutory and regulatory policies addressing PE and recess time—the PE and Recess State Policy Classification System (PERSPCS); (2) determine the inter-rater agreement of the system to code state statutory and regulatory policies enacted as of December 31, 2003; and (3) provide a baseline assessment of the variability in state policies related to PE and recess time.

Methods

Data Source

Statutes and regulations for each of the 50 states and the District of Columbia (hereafter referred to as "states") were obtained via primary legal research based on electronic searches of the Westlaw legal database.[22] Only state statutes and regulations that were enacted or adopted as of December 31, 2003 were included, regardless of their effective dates. Data were retrieved and analyzed in 2004 and 2005, respectively. Statutes reflect the codified compilations of laws enacted by a state over time (including amendments and repeals). For this project, regulations included all rules and regulations promulgated by the states (including amendments and repeals to existing provisions) that were codified in the state administrative code as of December 31, 2003—the study reference date. Searches of both statutes and regulations were necessary since PE and recess time policies may be formulated through both the legislative and executive branches of government. Hereafter, statutes and regulations will collectively be referred to as "policies." Keyword searches were developed to identify policies in Westlaw addressing the following areas: (1) PE time requirements, (2) staffing requirements for PE, (3) curriculum standards for PE, (4) assessment of health-related fitness, and (5) recess-related policies. The CDC's Nutrition and Physical Activity Legislative Database[23] and the National Conference of State Legislature's (NCSL) Health Promotion Program State Legislation and Statute Database[24] were used as secondary data sources to supplement the primary searches. To further cross-reference the searches, reports from the School Health Policies and Programs Study (SHPPS)[25] and the NASPE[26,27] were reviewed as tertiary sources of information.

Conceptual Framework and Development of PERSPCS

PERSPCS is based on the methodology developed by the National Cancer Institute (NCI) to examine changes in state tobacco control policy.[28,29] A conceptual framework, based on the socio-ecologic model,[30] is provided in Figure 1 to illustrate the underlying assumption of PERSPCS. PE-related policies at the state level are expected to have an impact on the school environment and social norms that may in turn affect children's behavior. Not all policies assessed in PERSPCS are expected to have an impact on behavior. For example, a policy to increase assessment of health-related fitness is expected to change school-level behavior by requiring schools to collect this information, but it may not have an impact on children's behavior. The current conceptual framework focuses on policies that can affect children's behavior during school hours. Other areas of interest, not currently incorporated, include after-school activities and walking to school.

Development of PERSPCS included a review of the literature, consultation with an expert panel followed by in-depth consultation with key experts, and pilot testing of the coding system. In addition, it was informed by reviewing: (1) various public health objectives and recommendations that relate to physical activity and PE (e.g., American College of Sports Medicine [ACSM],[31] Dietary Guidelines for Americans,[32]

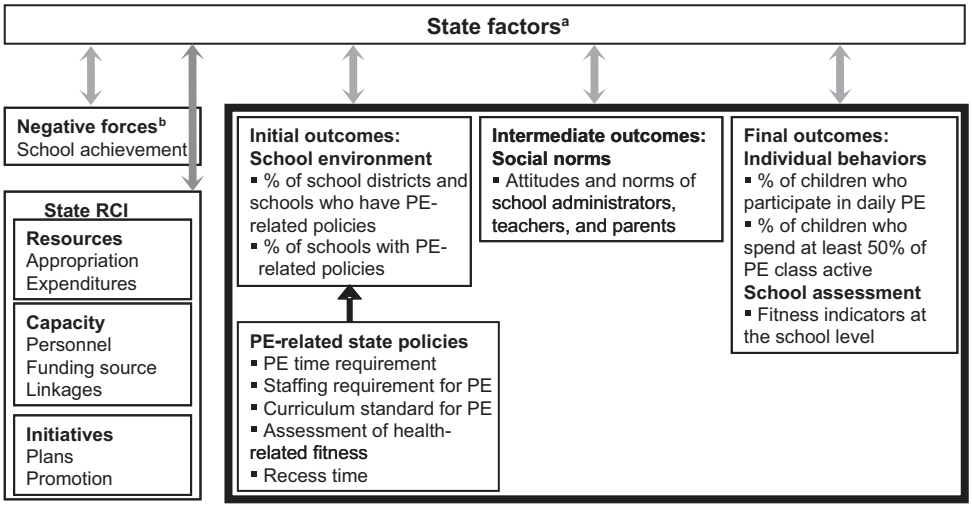

Figure 1. Physical education (PE) and recess time conceptual framework. [a]Age, education, population size, poverty status, race/ethnicity, urban/rural, baseline policies, sociopolitical factors. [b]This may be a force that can detract from allocating resources to PE.
RCI, resources, capacity, and infrastructure.

Healthy People 2010 objectives,[33] National Academy of Sciences,[34] Surgeon General's Report on Physical Activity and Health,[4] and others[35]); (2) position statements from agencies that recommend national standards or model policies for PE and recess,[15–17,36] and (3) by reviewing the criteria that have been used to develop the CDC School Health Index.[37] A panel (n=12) with expertise in physical activity, public health policy, and environmental health was convened in 2004. The expert panel focused on a broader group of topics that included urban planning, active transportation, community-based physical activity, and PE. PERSPCS represented a small component of this meeting, but it served to provide guidance on priority areas within each of the topics discussed at the meeting. Given the current attention to policy approaches in the school environment, starting with PE and recess time seemed timely. Based on the information from the scientific and gray literatures and input from the experts, an initial system was developed. As there were no agreed-upon standards to develop the policy classifications, select members from the expert panel provided feedback on several iterations of PERSPCS. Given the likelihood of policy variance in all areas except recess time, separate scores were created for policies addressing elementary, middle, and high schools.

A seven-state pilot test was conducted to investigate the reliability of PERSPCS both within and across topic areas, to make further revisions, and to refine the decision rules. California, Maine, New York, and Texas were selected for the pilot as they had the largest number of PE-related policies. Minnesota was chosen because a 2003 law repealed a number of PE-related policies. Missouri and West Virginia were selected to represent states with more rural areas. Two raters, with legislative expertise and knowledge of the project, independently coded 67 policies in these seven states. Agreement for the pilot was high (89%). Reviewing the discrepancies uncovered issues that served to fine-tune PERSPCS, including: (1) standardizing measurement of credit hours, (2) dealing with differences in grade configurations in school districts across and within states, and (3) dealing with the level of in-field teachers in PE. Table 1 summarizes the five policy areas addressed by PERSPCS, the maximum score within each policy area, and dichotomous enhancement or inhibiting factors that may affect policy implementation and/or impact. A complete description of the scoring system is included in Appendix A with decision rules available upon request.

As shown in Table 1, PERSPCS spans five areas, four of which are scored by grade levels (elementary, middle, and high schools). The scoring system ranged from a minimum score of 0 points to a maximum score of 5 points for PE time requirements or a maximum score of 4 points for the other policy areas. A score of 0 was assigned to a state when no policy existed for that policy area. The maximum score, on the other hand, reflected the most restrictive policy option for that policy area based on input from the experts. A score of 1 had somewhat consistent interpretation across policy areas, indicating that a policy was recommended but not mandated. The recommended level was included to facilitate future assessments of the relationship among varying levels of state policy restrictions and changes in the school environment, social norms, and student behaviors. Scores between 1 and 2 reflected gradually more restrictive policies for that policy area, and scores of 2 and above reflected that a policy in a given area was mandated (see Appendix A).

In addition to the policy-specific scores, a series of dichotomous subcodes was created to account for factors that might potentially enhance or inhibit the implementation of these policies. For PE time requirements, states were given credit for providing a policy that required daily PE participation in accordance with the recommendations of the expert panel. Conversely, a state's policy was considered to include a possible inhibiting factor if it allowed for PE substitutions based on a course or activity or if PE was not required for the entire school year. State policies were considered to potentially inhibit the impact of the PE teacher qualifications statewide if the staffing requirements for PE applied to some but not all school districts in the state. Such an allowance was considered as inhibiting, since there is literature suggesting that PE classes taught by certified instructors achieved better

Table 1. Policy areas for physical education (PE) and recess time

Policy areas	Description	Maximum score	Description of maximum score	Enhancement (E)/ inhibiting (I) factors
PE time requirements	Policies that address the amount of PE instruction required time for students.	5 points	State requires students in public schools to participate in PE for a minimum of 150 minutes per week (elementary school) and 225 minutes per week or the equivalent (middle and high schools).	E: State requires daily PE. I: State permits substitutions for PE OR PE is not required for the full school year.
Staffing requirements for PE	Policies that address certification requirements for newly hired teachers and education requirements for obtaining certification.	4 points	State offers certification/licensure/ endorsement to teach PE and requires newly hired PE teachers to be certified/licensed/endorsed and have a college major or its equivalent in PE.	E: None I: Teacher qualifications apply to most but not all school districts.
Curriculum standard for PE	Elements of the PE curriculum that are taught to students in elementary and secondary grades.	4 points	State standards address knowledge of physical activity, behavioral, and motor skills *and* health-related fitness OR the state requires that minimum national standards including such components be met.	E: None I: None
Assessment of health-related fitness	Policies that require the evaluation of student fitness in the following five areas: cardiovascular endurance, muscle strength, muscle endurance, flexibility, and body composition.	4 points	State requires students to participate in at least an annual fitness test that addresses each of the five assessment areas of interest.	E: State requires report on the assessment results. I: Fitness test is only required for a portion of the students.
Recess time (elementary schools only)	Policies for physical activity outside of the PE realm.	4 points	State requires public elementary schools to provide a minimum of 30 minutes of daily recess that does not substitute for PE.	E: None I: None

outcomes than those taught by noncertified personnel.[38] Finally for the assessment area, state policies were considered to include a potential enhancement if they required the health-related fitness assessment for a given education level to be reported to a specific state agency, whereas policies were considered potentially inhibiting if the assessment only was required for some, but not all, students.

Inter-Rater Agreement

Inter-rater agreement was established by having two raters (legal assistant and attorney) independently code each state's policies. Intraclass correlation coefficients (ICC)[39] were computed to assess the inter-rater agreement, one for each content area.

Policy Scores

Descriptive statistics were calculated to present the coding results. Two levels of aggregation were computed: one by grade level and one by policy areas. Data were aggregated across grade levels within the PE time requirements, staffing requirements for PE, curriculum standard for PE, and assessment of health-related fitness areas to determine the lowest policy that would be in effect for all grades in a given state. For example, a state with an aggregate score of 1 for PE time requirements indicates that across all grades the state received at least a score of 1. A state that received a score of 1 for high school but higher scores for both elementary and middle schools would receive an aggregate across-grade score of 1, reflecting the lowest policy restriction that would apply to all grade levels in that state.

A weighted summary score was computed by summing the across-grade-level scores for PE time requirements, staffing requirements for PE, curriculum standards for PE, and assessment of health-related fitness areas. The aggregated score did not include recess as it measures a non-PE-related dimension. The summary score was weighted to count the time requirements and staffing requirements scores at their full value (1.0) and to count the curriculum standards and assessment scores at half of their full value (0.5) (i.e., time requirements+staffing requirements+0.5*[curriculum standard+health assessment]). Our rationale for weighting the time and staffing areas higher than the standards and assessment areas was: (1) these areas may have a more direct impact on behaviors than the other areas, and (2) there is some evidence in the literature suggesting that increasing PE time and the qualification of the PE teachers can result in an increase in energy expendi-

ture and aerobic capacity in children.[2,8] All analyses were conducted in SPPS 14.01.

Results

Inter-Rater Agreement

Results indicated that the ICCs between the two raters ranged from a low of 0.876 (staffing requirements for PE) to a perfect agreement of 1.00 (recess time). The ICC across all five topic areas was high (0.947), indicative of the reliability of PERSPCS. All discrepancies were triangulated (two raters and a reconciler resolved the discrepancies by discussing and coming to an agreement) and the triangulated score was used for the remaining analyses.

Recess time was the least-difficult policy area to code because there were few provisions addressing recess in elementary schools, and the targets for this area were relatively straightforward—the existence of a policy requiring or recommending recess. In addition, only three states had recess provisions as of December 31, 2003. Staffing requirements for PE was the most difficult policy area to code, mainly because of unclear policy distinctions between the requirements for elementary and middle school PE teachers and the requirements for all-grade PE teachers. In other instances, such as in Delaware, the coding for staffing requirements was challenging because the state's regulation addressing teacher certification requirements (DEL. CODE REGS. § 14 1553 [2003]) included a number of options (i.e., several credit amounts, major in PE, or completion of a teacher preparation program), all of which could be coded differently.

Policy Areas and Grade-Level Scores

Table 2 presents grade-level scores and aggregated scores across grades with the state data aggregated across grades presented in Appendix B. State policy actions were more prevalent with regard to the time requirements, staffing requirements, and curriculum standards areas. However, the scores for the staffing requirements area were higher than all other policy areas. Within grade levels, policies were more restrictive at the high school level for the time and staffing requirements areas but were comparable across grade levels for the curriculum standards and assessment areas.

Physical Education Time Requirements

Approximately 20% of the states did not specifically have a policy addressing requirements for a minimal amount of time to be spent in PE for elementary or middle school students (score of 0). Conversely, this was quite different at the high school level, where only two states did not specifically address PE time requirements. The majority of the state policies received a score of at least 2 within each grade level, specifying at least some type of time requirement for PE. The policies went beyond simply recommending that PE occur or that it be an option, requiring less than 60 minutes per week of PE for elementary school children and less than 90 minutes per week of PE for middle and high school children. This finding was further illustrated by the results of the across-grade aggregation, which revealed that nearly 67% of the state policies received a score of at least 2. Only two states exceeded this score across grade levels by specifying at least a range of time equivalent to a score of 3 (requiring 60 to 90 minutes per week of PE for elementary school children and 90 to 150 minutes per week of PE for middle and high school children). No state policies achieved the PE time requirement maximum score for any of the grade levels. Few states required that PE be conducted on a daily basis at any grade level. Substitutions for PE or less than full-year requirements were less common at the elementary and middle school levels than at the high school level (27.5% of the states allowed this at the high school level).

Staffing Requirements for PE

States took a much more restrictive policy stance with regards to staffing requirements for a teacher to teach PE at the elementary, middle, or high school levels. At least 43% of the states (22 states) achieved a score of at least 2 for each grade level. In other words, in these states, certification/licensure/endorsement to teach PE was offered and the policies required newly hired PE teachers across grade levels to obtain this certification/licensure/endorsement as well as some other type of preparation that is less rigorous than a college minor in PE (e.g., less than 15 credit hours). The staffing requirements were somewhat more stringent at the middle and high school levels as compared to the elementary level, with the median scores at the middle and high school levels equating to a score of 3, which required state authorization and a college minor in PE. Only one state specified that the staffing requirements did not apply to all districts in the state.

Curriculum Standards for PE

State policy requirements for curriculum standards varied greatly within grade levels, although the across-grade-level scores were fairly consistent. Within each of the three grade levels, there appeared to be a tri-modal distribution: states either did not specify minimal curriculum standards (score of 0, 41.2% of states across grade levels); curriculum standards were required, but only by reference to a curriculum framework (score of 2, 25.5% of states across grade levels); or extensive state curriculum standards were required (score of 4, 19.6% across grade levels).

Table 2. Descriptive statistics of physical education (PE) and recess time policies by grade levels and aggregated across grade levels, as of December 31, 2003

		Elementary school		Middle school		High school		Aggregate–all grades		
Policy areas	**Score**	***n***	**%**	***n***	**%**	***n***	**%**	**Score**	***n***	**%**
PE time requirements	0	10	19.6	11	21.6	2	3.9	Some 0	11	1.6
	1	4	7.8	2	3.9	1	2.0	At least 1	4	7.8
	2	31	60.8	35	68.6	45	88.2	At least 2	34	66.7
	3	2	3.9	2	3.9	3	5.9	At least 3	2	3.9
	4	4	7.8	1	2.0	0	0.0	At least 4	0	0.0
	5	0	0.0	0	0.0	0	0.0	All 5	0	0.0
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum	5		5		5				
	Mean (SD)	1.73 (1.08)		1.61 (.94)		1.96 (.49)				
	Median	2		2		2				
	Observed Low-High	0–4		0–4		0–3				
	Enhancement factor	2	3.9	1	2.0	1	2.0			
	Inhibiting factor	3	5.9	2	3.9	14	27.5			
Staffing requirements for PE	0	5	9.8	1	2.0	0	0.0	Some 0	5	9.8
	1	1	2.0	1	2.0	1	2.0	At least 1	1	2.0
	2	22	43.1	23	45.1	21	41.2	At least 2	22	43.1
	3	10	19.6	12	23.5	14	27.5	At least 3	10	19.6
	4	13	25.5	14	27.5	15	29.4	All 4	13	25.5
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum	4		4		4				
	Mean (Std. Dev.)	2.49 (1.19)		2.73 (.96)		2.84 (.88)				
	Median	2		3		3				
	Observed Low-High	0–4		0–4		1–4				
	Inhibiting factor	1	2.0	1	2.0	1	2.0			
Curriculum standard for PE	0	19	37.3	20	39.2	19	37.3	Some 0	21	41.2
	1	3	5.9	3	5.9	2	3.9	At least 1	3	5.9
	2	13	25.5	12	23.5	15	29.4	At least 2	13	25.5
	3	4	7.8	4	7.8	5	9.8	At least 3	4	7.8
	4	12	23.5	12	23.5	10	19.6	All 4	10	19.6
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum	4		4		4				
	Mean (Std. Dev.)	1.75 (1.60)		1.71 (1.62)		1.71 (1.54)				
	Median	2		2		2				
	Observed low-high	0–4		0–4		0–4				
Assessment of health-related fitness	0	39	76.5	39	76.5	39	76.5	Some 0	39	76.5
	1	0	0.0	0	0.0	0	0.0	At least 1	0	0.0
	2	11	21.6	11	21.6	12	23.5	At least 2	12	23.5
	3	0	0.0	0	0.0	0	0.0	At least 3	0	0.0
	4	1	2.0	1	2.0	0	0.0	All 4	0	0.0
	Total	51	100.0	51	100.0	51	100.0	Total	51	100.0
	Maximum	4		4		4				
	Mean (SD)	0.51 (0.97)		0.51 (0.97)		0.51 (0.97)				
	Median	0.0		0.0		0.0				
	Observed low-high	0–4		0–4		0–2				
	Enhancement factors	4	7.8	4	7.8	4	7.8			
	Inhibiting factors	0	0.0	0	0.0	0	0.0			
Recess time	0	48	94.1					Some 0	48	94.1
	1	1	2.0					At least 1	1	2.0
	2	2	3.9					At least 2	2	3.9
	3	0	0.0					At least 3	0	0.0
	4	0	0.0					All 4	0	0.0
	Total	51	100.0					Total	51	100.0
	Maximum	4								
	Mean (SD)	0.10 (0.41)								
	Median	0								
	Observed low-high	0–2								

Assessment of Health-Related Fitness

State policies either did not address the assessment of health-related fitness (39 states across all grade levels, 76.5% of states) or they required students within each grade level to participate in the assessment of health-related fitness at least one time within the grade level (e.g., elementary, middle, or high schools; 12 states across all grade levels [23.5% of states]). Four states required that a report be provided at the state level at all grade levels, and no state specified that such assessment was required only within a specified grade level.

Recess Time

The vast majority of state policies did not incorporate recess time at the elementary school level (48 states, 94.1%). One state recommended recess without specifying a minimal amount of time, and two states required recess for less than 20 minutes per day or the policy required recess without specifying a minimal amount of time or frequency (score of 2).

Summary Scores

Table 3 presents descriptive statistics for the aggregated score (i.e., combined score across grade levels) for PE time requirements, staffing requirements for PE, curriculum standards for PE, and the assessment of health-related fitness as well as for the weighted summary score across the four PE-related areas (excluding recess). Consistent with the all-grade data presented above, the state policies were rather limited, particularly in the time requirements, curriculum standards, and assessment areas. Across the three grade levels, state policies hovered around the policy recommendation level (i.e., 1 point) for the time requirements area, a minimal restriction (i.e., the 2-point level) for the curriculum standards area, and at the policy recommendation (i.e., 1 point) or below level for the assessment area. Staffing provisions were somewhat more restrictive, with the state policies exceeding at least the minimal requirements (i.e., 2-point level), on average, across the three grade levels. Analysis of the weighted summary score revealed that, overall, the state policies were around the minimal requirements across policy areas and grade levels (i.e., score of 2). In other words, on average, the policies were more restrictive than a simple policy recommendation but not by much.

Discussion

Development of the PERSPCS is particularly timely given the increased interest in using policy-based approaches as one of multiple strategies to target childhood obesity. The purpose of this paper is to present the methodology developed to classify state policies for five key areas related to physical activity in the school environment, including PE and recess time requirements, staffing requirements for PE, curriculum standards for PE, and the assessment of health-related fitness. The methodology developed herein provides a reliable system for systematically and reliably classifying the nature and extent of state PE and recess time policies. PERSPCS can be a valuable tool to help states monitor change over time as it relates to these policy areas, as well as for providing longitudinal data for use in policy evaluation and impact studies.

These results provide a first look at the variability in state policies related to PE and recess time as of a December 31, 2003 baseline. Of the five policy areas examined, staffing requirements were most restrictive. Policies were increasingly less restrictive for each of the following areas: PE time requirements, curriculum standards for PE, the assessment of health-related fitness, and recess time. Staffing requirements for PE teachers likely had more restrictive policies mainly because teacher qualification has a longstanding history of being addressed at the state level as this is often included in the teacher credentialing section of the state regulations, although this is not necessarily specific to PE teacher qualifications.[40] Also, it was not surprising that the PE time requirement was the area that had the most restrictive policies. Most states have PE requirements for high school graduation, which can explain its ranking with respect to the other policy areas.[41] In addition, increasing PE time may have a more direct impact on behavior than the other areas.

Table 3. Summary scores for the physical education (PE) policies and weighted summary score for the PE-related policies, as of December 31, 2003

	PE time requirements	Staffing requirements for PE	Curriculum standard for PE	Assessment of health-related fitness	Weighted summary score[a]
Maximum	15	12	12	12	39
Mean (SD)	5.29 (2.24)	8.06 (2.79)	5.16 (4.60)	1.49 (2.77)	16.68 (5.33)
Median	6.00	7.00	6.00	0.00	16.00
Observed low-high score	0–11	3–12	0–12	0–10	6–31

[a]The summary score was weighted to count the time requirements and staffing requirements scores at their full value (1.0) and to count the curriculum standards and assessment scores at half of their full value (0.5).
SD, standard deviation.

As there is some evidence in the literature suggesting that increasing PE time alone may not be sufficient or the only approach necessary to increase physical activity during school hours, it is important to increase the policy action with respect to the other policy areas.[2,8,13,18,42] Although few states have mandated requirements for the assessment of health-related fitness, those that have a higher score in this policy area were more likely to have more restrictive policies governing PE time requirements ($r=0.348$, $p<0.05$) and curriculum standards for PE ($r=0.355$, $p<0.05$), potentially representing the more progressive PE-related states. Plans are underway to update the PERSPCS and to make the data available on the NCI website.

The 2003 scores provide a useful baseline against which future annual assessments can be compared to monitor changes in state policies related to PE and recess time. As PERSPCS is designed to capture the range of variability in state policies that go beyond the presence or absence of policy, it provides more descriptive information. Most importantly, such a system can be useful to incorporate into socio-ecologic studies aimed at examining the impact of state policies on the school environment, social norms, and behavioral outcomes at the macro- and micro-levels. To address the existing childhood obesity epidemic, there is a need to expand the current system to measure other areas related to physical activity (e.g., extracurricular activities, safe route to schools) and to combine it with nutrition-related policy classification information.[43]

The data are presented within the context of several limitations. First, it is important to consider that policies affecting the school environment with respect to PE and recess time also are enacted by lower levels of government, particularly at county, municipal, and/or school-district levels. For some areas, such as recess, where state requirements are minimal or virtually nonexistent, policy actions may be occurring at lower levels. Understanding such jurisdictional nuances is particularly important for assessing the interrelationship of public policies and their collective relationship with school practices and individual behaviors. By assessing only state policies or assessing only local policies, it may be difficult to ascertain the true policy environment and its relationship to system- and individual-level outcomes. Therefore, PERSPCS should be examined in conjunction with policies developed by local and school-district governments to determine overall effects of policies on system- and individual-level outcomes. PERSPCS provides a solid foundation for developing local-level policy indicators; however, the generalizability of the system to classify local-level policies needs to be established in future studies. In addition, it is expected that identifying and collecting local policies will require a different data-collection methodology, as lower-level policies are not readily available via a central electronic database.

Assessment of the reliability of PERSPCS utilized two coders, with one of them having legal expertise, and it is unclear if the same level of reliability would be obtained if the coders had different experience and background than was used in this study. Another limitation is that the reported data solely reflect a baseline assessment of PE and recess time laws developed by state legislatures and regulations promulgated by state agencies as of December 31, 2003. The analysis did not include Executive Orders nor did it account for state Attorney General opinions or any case law that may have existed to examine the legality of a given law. Likewise, it is important to recognize that many other policy areas beyond those presented in this system (such as those prescribed in model school wellness polices) relate to school- and individual-level outcomes. While including these additional policy areas was beyond the scope of this study, future efforts will be well-served by incorporating them to assess the nature and extent of those policies. Finally, the system also does not capture information on the implementation of policies by responsible state agencies or by school districts. Future research to understand the true "meaning" or impact of these policy actions is needed as enacting a policy is an important first step but it does not necessarily mean that it will be enforced. PERSPCS does not track enforcement but it can serve to conduct such evaluation. In several cases, it is still necessary to examine whether varying levels of policy requirements or restrictions have differential impacts on the school environment, social norms, and student-level behavior change. Yet a meaningful assessment of the potential policy impact of varying levels of restrictions would not be possible without ongoing classification of the nature and extent of these policies. This paper provides information on baseline policy status; additional years of data will be needed to conduct actual policy impact studies.

It should be noted that PERSPCS was developed to assess policy variability across and within states for a specific area but is not meant to provide policy guidelines. Currently, the evidence supporting a given policy change is not firmly established for PE and recess time. Until the predictive validity of these scores is established, it is not feasible to make policy recommendations. Therefore, it is important that the scoring system not be inappropriately used until more empirical data become available to guide policymakers. For example, it is unclear what will be the impact of having extensive state policies governing the assessment of health-related fitness. This may depend on how the data will be used. If the health-related fitness assessment data are aggregated at the school-district level and are reported only as such, it is unlikely to be as controversial as reporting individual data in the student report card, where the latter may have a negative impact on behavior as well as having unintended emotional conse-

quences. This illustrates that it is yet unknown if more restrictive policies are needed to have the desired behavioral outcome.

To summarize, this study developed a system for classifying the nature and extent of state PE and recess time policies. Given the inter-rater agreement in using this system to classify state policies, it suggests a high reliability in measuring the variability in the state policies. Therefore, the methodology developed as part of this paper provides a reasonable framework to begin to evaluate the impact of policies on environmental and behavioral outcomes.

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Appendix A: Physical education (PE) and recess time policy measurement system for elementary (ES), middle (MS), and high (HS) schools

Score	Description
PE time requirements	
5	ES: State requires students in public ES to participate in PE for a minimum of 150 minutes per week. MS/HS: State requires students in public MS/HS to participate in PE for a minimum of 225 minutes per week (or the equivalent in credit(s) based on the Carnegie unit).[a]
4	ES: State requires students in public ES to participate in PE for a minimum of 90 minutes per week but less than 150 minutes per week. MS/HS: State requires students in public MS/HS to participate in PE for a minimum 150 minutes per week but less than 225 minutes per week (or the equivalent in credit(s) based on the Carnegie unit).
3	ES: State requires students in public ES to participate in PE for a minimum 60 minutes per week but less than 90 minutes per week. MS/HS: State requires students in public MS/HS to participate in PE for a minimum of 90 minutes per week but less than 150 minutes per week (or the equivalent in credit(s) based on the Carnegie unit).
2	ES: State requires PE for less than 60 minutes per week; or state requires PE (daily/weekly/annually) without a specified time requirement. MS/HS: State requires PE in MS/HS for less than 90 minutes per week; or state requires PE (daily/weekly/annually) without a specified time requirement.
1	ES/MS/HS: State recommends a PE time requirement; or state requirement for physical activity includes an option for PE.
0	ES/MS/HS: No PE requirement. **Potential enhancement factor:** Applies if state specifies daily participation in PE. **Potential inhibiting factor:** Applies if state permits substitution for PE based on a course or activity; or if state specifies that PE instruction is not required for the full school year.
Staffing requirements for PE	
4	ES/MS/HS: State offers certification/licensure/endorsement to teach PE and requires newly-hired PE teachers to have certification/licensure/endorsement and a college major (or a minimum of 30 credit hours) in PE (to fulfill certification/licensure/endorsement requirement or otherwise.
3	ES/MS/HS: State offers certification/licensure/endorsement to teach PE and requires newly-hired PE teachers to have certification/licensure/endorsement and a college minor (or a minimum of 15 credit hours) in PE (to fulfill certification/licensure/endorsement requirement or otherwise).
2	ES/MS/HS: State offers certification/licensure/endorsement to teach PE and requires newly-hired PE teachers to have certification/licensure/endorsement and preparation that is less rigorous than a college minor (e.g., less than 15 credit hours) in PE (to fulfill certification/licensure/endorsement requirement or otherwise).
1	ES/MS/HS: State recommends certification/licensure/endorsement) and an academic degree in PE to teach PE.
0	ES/MS/HS: No requirement or no PE. **Potential inhibiting factor:** Applies if teacher qualifications apply to most but not all districts (e.g., not applicable to districts that regularly employ fewer than 20 teachers).
Curriculum standard for PE	
4	ES/MS/HS: State standards are required for PE that address student knowledge of physical activity, behavioral and motor skills, and health-related fitness; or state requires ES to meet national standards that include such component.
3	ES/MS/HS: State standards are required for PE that address student knowledge of physical activity, behavioral and motor skills, or health-related fitness, but not all such components.
2	ES/MS/HS: State standards are required, but by reference to a curriculum framework (or the equivalent) only.
1	ES/MS/HS: State recommends standards/guidelines for PE.
0	ES/MS/HS: No requirement or no PE.
Assessment of health-related fitness	
4	ES: State requires students in appropriate grade(s) (e.g., grade x and above) to participate in an annual (or more frequent) fitness test that addresses cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition (or a standard fitness test that includes such components). MS/HS: State requires students to participate in an annual (or more frequent) fitness test that addresses cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition.
3	ES: State requires students in appropriate grade(s) (e.g., grade x and above) to participate in a biannual fitness test that addresses cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition (or a standard fitness test that includes such components). MS/HS: State requires students to participate in a biannual fitness test that addresses cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition.

Score	Description
2	ES: State requires students in appropriate grades(s) (e.g., grade x and above) to participate in a health-related fitness test at least once in ES, with or without specified fitness test components. MS/HS: State requires students to participate in a health-related fitness test at least once in MS/HS, with or without specified test components.
1	ES: State recommends health-related fitness testing in appropriate grade(s). MS/HS: State recommends health-related fitness testing.
0	ES/MS/HS: No requirement or no PE. **Potential enhancement factor:** applies if state (e.g., state education agency) requires a report on results of such testing. **Potential inhibiting factor:** applies if fitness test is required for only a portion of students in appropriate grades.
Recess time—elementary school	
4	State requires public ES to provide a minimum of 30 minutes of daily recess that does not substitute for PE.
3	State requires public ES to provide a minimum of 20 minutes but less than 30 minutes of daily recess that does not substitute for PE.
2	State requires public ES to provide recess for less than 20 minutes per day; or requires recess without a time and/or frequency requirement.
1	State recommends recess.
0	No requirement.

[a]Credit are not specified, 1.0 credit unit is equivalent to 120 hour/year of PE instruction.

Appendix B: Weighted summary scores and raw scores for physical education (PE) by state and topic, as of December 31, 2003

State	PE time requirements	Staffing requirements for PE	Curriculum standard for PE	Health-related fitness assessment	Recess time	Weighted summary score
AK	2	6	0	0	0	8
AL	6	6	6	0	0	15
AR	7	9	10	0	0	21
AZ	6	3	0	6	0	12
CA	11	6	5	6	1	22.5
CO	0	6	0	0	0	6
CT	6	12	0	0	0	18
DC	2	12	0	0	0	14
DE	6	9	6	0	0	18
FL	6	12	6	0	0	21
GA	5	12	12	0	0	23
HI	2	6	2	0	0	9
IA	6	9	9	0	0	19.5
ID	6	6	0	0	0	12
IL	6	3	0	0	0	9
IN	4	8	8	0	0	16
KS	6	6	0	0	0	12
KY	2	6	0	0	0	8
LA	2	10	0	0	0	12
MA	6	6	3	0	0	13.5
MD	6	12	12	0	0	24
ME	6	12	12	6	0	27
MI	6	9	0	0	0	15
MN	6	6	0	0	0	12
MO	6	12	9	0	0	22.5
MS	4	7	6	0	0	14
MT	2	9	9	0	0	15.5
NC	6	6	0	0	0	12
ND	8	6	0	0	0	14
NE	6	9	9	0	0	19.5
NH	6	6	12	0	0	18
NJ	6	9	6	6	0	21
NM	6	12	12	6	0	27
NV	7	6	12	0	0	19
NY	10	12	12	6	0	31
OH	6	6	6	6	0	18
OK	1	6	12	0	0	13

State	PE time requirements	Staffing requirements for PE	Curriculum standard for PE	Health-related fitness assessment	Recess time	Weighted summary score
OR	6	6	6	0	0	15
PA	6	6	12	6	0	21
RI	6	6	2	0	0	13
SC	2	12	2	0	0	15
SD	0	9	0	0	0	9
TN	6	6	6	0	0	15
TX	5	9	3	0	2	15.5
UT	6	4	6	6	0	16
VA	6	12	0	0	2	18
VT	6	12	6	6	0	24
WA	9	9	0	0	0	18
WI	5	12	6	0	0	20
WV	6	4	12	10	0	21
WY	6	6	6	6	0	18