

State and District Policy Influences on District-Wide Elementary and Middle School Physical Education Practices

Jamie F. Chriqui, PhD, MHS; Amy Eyler, PhD; Cheryl Carnoske, MPH, RD; Sandy Slater, PhD, MS

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Objective: To examine the influence of state laws and district policies on district-wide elementary school and middle school practices related to physical education (PE) time and the percentage of moderate-to-vigorous physical activity (MVPA) time during PE. **Design:** Multivariate, cross-sectional analysis of state laws, district wellness and PE policies, and district PE practices for school year 2010-2011 controlling for district-level urbanicity, region, size, race/ethnicity of students, and socioeconomic status and clustered on state. **Setting:** One hundred ninety-five public school districts located in 42 states. **Participants:** District-level PE coordinators for the included districts who responded to an online survey. **Main Outcome Measure:** Minutes and days of PE per week and percent time spent in MVPA during PE time. **Results:** District PE coordinators reported significantly less PE time than national standards—82.9 and 189.6 minutes at the elementary school and middle school levels, respectively. Physical education was provided an average of 2.5 and 3.7 days per week, respectively; and the percentage of MVPA time in PE was 64.4% and 65.7%, respectively. At the elementary school level, districts in either states with laws governing PE time or in a state and district with a law/policy reported significantly more days of PE (0.63 and 0.67 additional days, respectively), and districts in states with PE time laws reported 18 more minutes of PE per week. At the middle school level, state laws were associated with 0.73 more days of PE per week. Neither state laws nor district policies were positively associated with percent MVPA time in PE.

Conclusions: State laws and district policies can influence district-level PE practices—particularly those governing the

frequency and duration of PE—although opportunities exist to strengthen PE-related laws, policies, and practices.

KEY WORDS: district wellness policies, physical activity, physical education, policy, state law

The National Physical Activity Guidelines and *Healthy People 2020* recommend that children and youth get at least 60 minutes of moderate-to-vigorous physical activity daily (MVPA).^{1,2} Yet, most youth do not achieve this level of physical activity (PA).³

Author Affiliations: Institute for Health Research and Policy (Dr Chriqui) and Department of Health Policy and Administration (Dr Slater), School of Public Health, and Department of Political Science, College of Liberal Arts & Sciences (Dr Chriqui), University of Illinois at Chicago; and Prevention Research Center in St Louis (Dr Eyler), George Warren Brown School of Social Work (Dr Eyler and Ms Carnoske), Washington University in St Louis, St Louis, Missouri.

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Correspondence: Jamie F. Chriqui, PhD, MHS, Institute for Health Research and Policy, School of Public Health, 5th Floor, Westside Research Office Bldg, 1747 W Roosevelt Rd, Chicago, IL 60608 (jchriqui@uic.edu).

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Given that children spend approximately 30 to 35 hours per week in school for at least 9 months a year, schools provide a unique opportunity to engage children and youth in PA. Yet, given the emphasis on subjects such as reading, writing, and arithmetic, many school districts and schools do not prioritize PA and/or physical education (PE) during the school day.⁴ While the provision of PE is fairly commonplace, the duration, frequency, and quality of PE varies tremendously.^{3,5,6} A recent consensus statement concluded that increasing PE frequency and duration, increasing the amount of MVPA time in PE, and providing trained teachers to implement PE are keys to increasing in-school PA.⁷

States laws and district policies govern PE in schools.^{8,9} Most state laws have been on the books for a number of years and have not changed substantially since 2003.⁸ And, although not required, many districts incorporated PE provisions into their congressionally mandated school district wellness policy.⁹ (See the Supplemental Digital Content Table, available at: <http://links.lww.com/JPHMP/A23>, that illustrates the nationwide prevalence of state laws and district policies governing PE time and MVPA time.)

Research on the relationship between state and/or district PE laws and policies, respectively, is emerging. Taber and colleagues¹⁰ illustrated that district policies are stronger in states with strong PE laws, indicative of top-down policy making.¹¹ Yet, Eyler and colleagues¹² documented the relative lack of evidence-based elements in state PE laws, with only 16% and 11% of all such laws enacted between 2001 and 2007 containing language governing PE time or activity time, respectively. Several studies have found a relationship between specific PE time requirements and elementary school (ES) and/or middle school (MS) PE time practices.¹³⁻¹⁵ Cawley and colleagues¹⁶ found that state laws were associated with more student time in PE and, in a California study, state PE mandates were associated with district-level compliance and student fitness levels.¹⁷ Kim¹⁸ found no relationship between state PE laws and school-level PE, children's PA, or obesity. And, Evenson and colleagues¹⁹ found that a North Carolina statewide PE and recess policy change was associated with increased PA participation, awareness of healthy habits, student focus on studies, alertness and enjoyment, and higher staff involvement. Although literature in this area is growing, we are unaware of any study to examine the relationship between state laws, district policies, and district-level PE practices. This study seeks to fill this gap by illustrating the extent to which state and/or district PE time and MVPA time laws and policies, respectively, are being implemented in practice in districts nationwide and to highlight policy opportunities.

● Methods

Data sources

State laws

State laws for each of the 50 states were compiled by Bridging the Gap researchers at the University of Illinois at Chicago.²⁰ The state laws, effective as of the beginning of September of school year 2010-2011, were identified through key word searches of the full-text, tables of contents, and indices of codified state statutory and administrative laws commercially available from Westlaw (www.westlaw.com) and Lexis-Nexis (www.lexis.com). Codified state statutory laws include legislation, whereas codified administrative laws include all rules/regulations promulgated by state Boards of Education. "Informal," noncodified policies adopted by state Boards of Education were excluded from this study. The codified state laws were validated against secondary sources.^{8,21,22}

District policies

The district sample was developed at the University of Michigan's Institute for Survey Research, using sampling frames based on the National Center for Education Statistics' Common Core of Data files. Districts from all contiguous US states were eligible.

"On-the-books" district policies effective as of the beginning of the 2010-2011 school year were obtained from 581 districts (98% policy collection rate⁹) in 47 states through Internet research with telephone and electronic mail follow-up.⁹ District policies were defined broadly to include: the district-approved wellness policy, any associated district regulation, and any state or district policies embedded by reference in the wellness policy/regulation (ie, PE policies). The University of Illinois at Chicago's institutional review board declared the district policy collection "not human subjects research."

District sample and survey

District sample—Each district with a policy was contacted to confirm the PE coordinator and to obtain the coordinators' contact information. Physical education was coordinated either at the district level (78%) or at the school level (22%). Since this study sought to assess district-level implementation of state laws and district policies, the survey was restricted to the 444 districts (located in 45 states) with district-level PE coordination. (The 2 other states included in the original district sample did not have any sampled districts with district-level PE coordination.) District PE coordinator responsibilities ranged from PE curriculum coordinators, to health/wellness specialists, to athletic/fitness coordinators. Compared with excluded districts,

included districts were more high and less mid socioeconomic status (SES), less small and more medium-sized, and more suburban and less rural.

District survey—An Internet survey of district PE practices, approved by the Washington University’s institutional review board, was conducted between February and May 2011 with the district PE coordinators. This analysis focused on the survey items related to PE frequency and duration and percentage of PE time spent doing MVPA at the ES and MS levels.

Third grade was the ES referent category, with 3 relevant questions asked. First, “On average, how many days (range, 1-5) per week is PE required for third-grade students?” Second, an open-ended numeric question asked, “On average, how many minutes per week of PE do students in third-grade receive?” The third question asked, “What percentage of time do third-grade students spend engaged in active PE, that is, activity that will elevate their heart rates such as running, jumping jacks, etc?” Ordinal response options ranged from 0% to 100%. All questions included a “do not know” option.

Eighth grade was the MS referent category. Given the variability in MS scheduling, options to assess block scheduling were included to account for longer class periods and fewer days per week associated with block scheduling. PE coordinators were first asked, “What type of scheduling is used for eighth-grade within the district?” Response options were as follows: 1, block scheduling only; 2, standard scheduling only; and 3, both block and standard scheduling. “Block only” or “both block and standard scheduling” respondents were asked an open-ended numeric question: “On average, how long is each block of time allotted for PE?” This question was followed by “On average, how many blocks per week of PE do eighth-grade students receive?” Response options ranged from 1 to 5, with options for “every other day” and “it varies.” Respondents indicating that they used “standard scheduling only” were asked an open-ended numeric question: “How many days per week is PE required for eighth-grade students?” Standard scheduling-only districts were not asked the length of each PE session. Instead, researchers at Washington University collected the information via Internet research with electronic mail and telephone follow-up. A question on percent time in MVPA, akin to the question asked for third grade, was also asked for the eighth-grade level of applicability. All questions included a “do not know” option.

The survey was pilot tested to determine completion time and question wording. Washington University researchers e-mailed the survey to each PE coordinator through Qualtrics Online Survey Software (Qualtrics Labs Inc, Provo, Utah) along with an introductory

e-mail explaining the survey purpose and offering an opportunity to be entered into a raffle for a \$25 gift card for survey completion. Three follow-up electronic mail messages were sent.

Analytic variables

Policy predictors (independent variables)

All state laws and district policies were double-coded by 2 trained coders, using a reliable and valid ordinal coding scheme.²³ Coding agreement was high (ranging from 94% to 97%), and discrepancies were resolved through discussion among the coders and the lead author. The original PE time policy coding schemes ranged from a strong policy that met the National Association for Sport and Physical Education recommendation of 150 minutes of PE per week (ES) and 225 minutes of PE per week (MS) (level 2 code),²⁴ a lesser requirement or only a suggested time standard (level 1 code), to no law/policy (level 0 code). The MVPA laws/policies were coded as follows: 2, requirement that at least 50% of PE time be spent in MVPA; 1, requirement that less than 50% of PE time be spent in MPVA or encouraged that PE time be spent in MVPA; and 0, no MVPA-related law/policy.

Because of a limited number of survey-responding districts being located in a state and/or district with a strong (level 2) state law and/or district policy for either topic, dichotomous variables (1, any law/policy; 0, no law/policy) were created for each item by grade level of applicability. The state and district variables were cross-tabulated to create a variable (one for each grade level of applicability), with 4 mutually exclusive and exhaustive categories to indicate policy jurisdiction: none (neither district nor state); district only; state only; or both district and state. Each of the latter categories was compared against “none” (referent).

District practices (outcome variables)

Elementary school items

Responses greater than zero for the third-grade minutes per week were received from all but 19 districts requiring PE. All but 13 districts responded to the question regarding the number of days of third-grade PE. And, 147 districts responded to the active time in PE question for third grade.

Middle school items

Response rates also varied for the MS items. Forty-six of the 53 districts with block scheduling responded to the number of blocks offered per week. For the standard scheduling districts, data on the number of minutes per session were obtained from 115 of the 130 standard

scheduling districts. Responses were received from 145 districts on the number of days of PE required per week for eighth grade. Missing data for all ES and MS items were replaced with the item mean.

To standardize responses across standard and block scheduling districts, 2 new variables, "PE_TIMES" and "PE_MINWEEK," were computed. PE_TIMES reflected the number of days per week that PE was offered in eighth grade and was based on the number of days of PE per week for standard schedule districts and the number of blocks per week for block districts. PE_MINWEEK was calculated by multiplying the minutes per session by the number of days per week for standard scheduling districts and the minutes per block times the number of blocks per week for block scheduling districts.

District-level contextual controls—District-level characteristics were obtained from National Center for Education Statistics' 2009-2010 Common Core of Data (data for school year 2010-2011 were not available at the time of this analysis). For each district, data were obtained on the total number of students (school size, collapsed into tertiles based on the data distribution of small, medium, and large [referent] districts based on student enrollment); US census region (South [referent], West, Midwest, and Northeast); and locale (city [referent], suburb, township, or rural). The percentage of students eligible for free or reduced price lunch was used as a proxy for SES, divided into 3 groups on the basis of free or reduced price lunch distribution: higher SES (referent), medium SES, or lower SES. School racial/ethnic composition was coded as 1 of 4 exhaustive and mutually exclusive categories: majority white (referent); majority Hispanic; majority black; and diverse (no majority). (Table 1 provides the cutoffs for each of the categorical variables.)

Analytic methods

Analyses were conducted using Stata/SE v.12.1.²⁵ Because of the nonnormal distribution of the outcome measures, Poisson regressions were used with robust standard errors and state clustering to account for the lack of heterogeneity in state laws for multiple districts within each state. In addition, to ease interpretation, predicted margins and marginal effects were computed. The predicted margins equal the adjusted outcome (eg, days of PE per week) within each policy category, controlling for covariates. The marginal effects represent the average difference in the outcome (eg, days of PE per week) associated with the state and/or district policies as compared with districts in states/districts without the given law/policy.

TABLE 1 • Characteristics of the Districts Included in the Analytic Sample

Characteristics	Elementary School Level ^a	Middle School Level ^b
<i>Policy predictors, %</i>		
Any PE time per week policy		
None	37.4	47.0
District only	15.3	14.2
State only	26.3	21.9
Both district and state	21.1	16.9
Any MVPA in PE policy		
None	47.4	58.5
District only	21.6	19.1
State only	10.5	8.2
Both district and state	20.5	14.2
<i>Outcome variables, mean (range)</i>		
Days of PE per week	2.5 (1-5)	3.7 (1-5)
Minutes of PE per week	82.9 (30-225) ^c	189.6 (45-450) ^d
% PE time in MVPA	64.4 (10-100)	65.7 (10-100)
<i>Control variables, %</i>		
Census region		
West	16.8	17.9
Midwest	38.3	38.0
South	22.5	22.3
Northeast	21.5	21.7
Urbanicity		
Large- to mid-sized city	14.1	13.6
Suburb	37.7	38.0
Rural	29.3	28.3
Township	18.9	20.1
District size		
Small (<1682 students)	22.5	22.3
Medium (1682-5892 students)	39.8	39.7
Large (>5892 students)	37.7	38.0
Majority race/ethnicity of students		
White (≥66% white)	65.4	64.7
Black (≥50% black)	5.2	5.4
Hispanic (≥50% Hispanic)	5.8	6.5
Mixed	23.6	23.4
FRL eligibility ^e		
Low (<34% eligible)	43.2	43.7
Medium (34%-53% eligible)	26.8	25.7
High (>53% eligible)	30.0	30.6

Abbreviations: FRL, free or reduced price lunch; MVPA, moderate-to-vigorous physical activity; PE, physical education.

^aN = 191 districts with policies applicable at the elementary school level unless otherwise noted.

^bN = 184 districts with policies applicable at the middle school level unless otherwise noted.

^cFour districts reported zero PE minutes at the elementary school level, so the final analytic N = 187 districts at the elementary school level of applicability.

^dFour districts reported 400 to 450 minutes of PE per week at the middle school level. Regression models were run both with and without those cases, and the results remained the same, so we included the 4 cases in the final models.

^eOne district was missing FRL data, so the final analytic for regression models is N = 190 districts for PE days per week and N = 186 for PE per minutes per week at the elementary school level of applicability and 183 districts at the middle school level of applicability.

● Results

Completed surveys were received from 195 unique districts (44% response rate) located in 42 states. Respondent districts were not statistically different from nonresponders on any characteristics. Table 1 presents the responder characteristics. Physical education time policies were more common at the state level, whereas MVPA policies were more common at the district level. Districts reported an average of 2.5 and 3.7 days of PE per week at the ES and MS levels, respectively, and an average of 82.9 (ES) and 189.6 minutes (MS) of PE per week. And, districts reported a high percentage of MVPA time—64.4 (ES) and 65.7 (MS) percent time. Districts were distributed across regions and locales. Districts were majority white, predominantly medium or large in size, and more than 43% had low free or reduced price lunch participation rates (high SES).

As indicated in Table 2, both state laws and district policies were positively associated with more minutes and days of PE per week. At the ES level, districts located in states with a PE time law offered PE 0.63 more days per week (2.78 vs 2.15 days) and districts in both states and districts with PE time laws/policies offered PE 0.67 more days per week than those with no such laws/policies (2.82 vs 2.15 days). Similarly, districts in states with PE time laws offered PE for 18.07 minutes more per week than districts located in a state without such a law (93 vs 74.93 minutes per week). At the MS level, state PE time laws were significantly associated with the number of days of PE offered per week—0.73 more days per week than districts located in a state without such a law (4.18 vs 3.44 days per week).

State laws and district policies addressing MVPA time were not positively associated with district reports of MVPA time (Table 3); however, with 2 exceptions,

TABLE 2 ● Association Between State Law and/or District Policy Addressing PE Time per Week and District Practices Regarding PE Days and Minutes per Week by Grade Level of Applicability

Policy Category	No. Districts Within Policy Category	Coefficient ^a (95% CI)	Robust SE	Adjusted ^{a,b} Days or Minutes of PE per Week at the District Level (Practices)	Marginal Effect
<i>Elementary school level of applicability</i>					
Any PE time per week policy (predicting days per week) (N = 190 districts)					
None	71	REF	...	2.15	...
District only	29	0.13 (−0.02 to 0.28)	0.08	2.44	0.29
State only	50	0.26 (0.07 to 0.44) ^c	0.09	2.78	0.63
Both district and state	40	0.27 (0.07 to 0.47) ^c	0.10	2.82	0.67
Any PE time per week policy (predicting minutes per week) (N = 186 districts)					
None	68	REF	...	74.93	...
District only	29	0.07 (−0.07 to 0.22)	0.07	80.55	5.61
State only	50	0.22 (0.02 to 0.41) ^d	0.10	93.00	18.07
Both district and state	39	0.14 (−0.07 to 0.35)	0.11	86.43	11.50
<i>Middle school level of applicability (N = 183 districts)</i>					
Any PE time per week policy (predicting days per week)					
None	86	REF	...	3.44	...
District only	26	0.08 (−0.07 to 0.22)	0.08	3.71	0.27
State only	40	0.19 (0.05 to 0.34) ^c	0.07	4.18	0.73
Both district and state	31	0.12 (−0.06 to 0.29)	0.09	3.86	0.42
Any PE time per week policy (predicting minutes per week)					
None	86	REF	...	179.78	...
District only	26	0.05 (−0.09 to 0.19)	0.07	188.31	8.53
State only	40	0.16 (−0.03 to 0.35)	0.10	211.75	31.96
Both district and state	31	0.06 (−0.13 to 0.25)	0.33	191.39	11.60

Abbreviations: CI, confidence interval; PE, physical education; SE, standard error.

^aAll models were adjusted for region (south ref), district size (small ref), free or reduced price lunch participation (low ref), locale (city ref), and majority race/ethnicity of district student population (white ref).

^bThe adjusted days or minutes per week reflect the average days or minutes of PE per week reported by the district PE coordinator within each category of state law/district policy and grade level of applicability after controlling for all covariates.

^c $P < .01$.

^d $P < .05$.

TABLE 3 • Association Between State Law and/or District Policy Addressing% of PE Time Spent Doing MVPA and District Practices Regarding% of PE Time Spent Doing MVPA by Grade Level of Applicability

Policy Category	No. Districts Within Policy Category	Coefficient ^a (95% CI)	Robust SE	Adjusted ^{a,b} % of MVPA Time in PE (Practices)	Marginal Effect
Elementary level of applicability (N = 190 districts)					
None	90	REF	...	66.37	...
District only	41	-0.07 (-0.13 to -0.01) ^c	0.03	61.68	-4.69
State only	20	-0.04 (-0.13 to 0.05)	0.05	63.72	-2.65
Both district and state	39	-0.04 (-0.20 to 0.12)	0.08	63.77	-2.59
Middle school level of applicability (N = 183 districts)					
None	107	REF	...	68.56	...
District only	35	-0.11 (-0.20 to -0.03) ^c	0.04	61.32	-7.24
State only	15	-0.06 (-0.13 to 0.02)	0.04	64.81	-3.75
Both district and state	26	-0.13 (-0.28 to 0.01)	0.07	60.07	-8.49

Abbreviations: CI, confidence interval; MVPA, moderate-to-vigorous physical activity; PE, physical education; SE, standard error.

^aAll models were adjusted for region (south ref), district size (small ref), free or reduced price lunch participation (low ref), locale (city ref), and majority race/ethnicity of district student population (white ref).

^bThe adjusted percentage of MVPA time in PE reflects the average percent MVPA time in PE reported by the district PE coordinator within each category of state law/district policy and grade level of applicability after controlling for all covariates.

^c $P < .05$.

neither state laws nor district policies were statistically related to such practices. The exceptions were that district PE coordinators reported that 4.69% and 7.24% less PE time was spent in MVPA at the ES and MS levels, respectively, when the district had an MVPA policy than districts where such a policy did not exist. State laws were not significantly associated with district MVPA time.

● Discussion

This study illustrated the extent to which public school districts are implementing state and/or district PE time and MVPA time laws and policies. Consistent with prior research, this study illustrates that state laws, in particular, have been influential in affecting district-wide practices regarding PE time.^{17,19} District policies were associated only with increased PE time when the state also had such a law, indicative of top-down policy making,¹¹ and not surprising given that district PE policies are stronger in states with stronger PE laws.¹⁰

While the relationship between the state laws and district policies with district PE practices is encouraging, it is important to note that they all fell well below the National Association for Sport and Physical Education–recommended amount of PE time. Clearly, more efforts are needed to find ways (from both a competing demand and a resource standpoint) to enable districts to offer more PE time.

Neither state laws nor district policies positively influenced the amount of MVPA time in PE. It is possible

that the district respondents overreported the amount of MVPA time (~64%) as compared with prior observational research that found that only 35% to 38% of PE time was for MVPA²⁶⁻²⁹ and therefore one would not be able to correctly interpret the outcome. In addition, as indicated in Supplemental Digital Content Table (available at: <http://links.lww.com/JPHMP/A23>), most states and districts do not address this issue in their laws and policies and, when they do, districts are more likely than states-only to address the issue, thus policy opportunities exist to continue to enhance and oversee implementation of laws in this area.^{9,12,30}

As always, the findings are subject to several limitations. First, this was a study of association and not causation. Second, the district practices were self-reported by district PE coordinators and thus are subject to reporting error and/or bias based on the extent of the respondents' knowledge regarding district-wide practices regarding PE time and MVPA time. While we attempted to reach the district official most knowledgeable about PE practices, respondent knowledge about actual practices may be limited to what they believe as opposed to what actually is happening in practice. Third, we were unable to assess the relationship between laws and policies and school-level practices or student time spent in PE or MVPA time in PE. Future research would be well served to explore the relationship between state laws, district policies, and student-level PE time and MVPA time in PE. Finally, survey responders primarily represented larger, predominantly white and high-SES districts nationwide; thus, the results may not be generalized to all districts nationwide.

In conclusion, state laws and district policies have the potential to influence PE time at the ES and MS levels; however, state laws clearly seem to be driving district PE time practices. Interestingly, although the laws and policies in this area were not “strong” (ie, they did not meet the National Association for Sport and Physical Education–recommended standards), the results of this study indicated that even “weaker” policies with lesser time standards are associated with increased PE time. Given that most state laws and district policies in this area do not change frequently^{9,10} and given that states and districts are constantly navigating the competing demands for time during the school day as well as resource limitations, policy changes in this area will be challenging, but the results of this study suggest that PE time laws/policies can influence district PE time practices. Given these challenges, districts would be well served to engage in cross-sectoral collaborations such as those recommended by the both the National Physical Activity Plan³¹ and the Institute of Medicine³² with the education sector working with other groups such as parks/recreation, transportation, health care, etc, to facilitate increased PA time among school-aged children.

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