Center for Health Economics and Policy
INSTITUTE FOR PUBLIC HEALTH AT WASHINGTON UNIVERSITY

Impact of State Laws Governing Physical Education on Attendance among U.S. High School Students, 2003–2017

by Ruopeng An, PhD; Mengmeng Ji, MS; Caitlin Clarke, PhD; Chenghua Guan, PhD

January 2020

Introduction

Inadequate physical activity in adolescents has been associated with elevated risks for childhood obesity, musculoskeletal injury, mental health problems, compromised psychological function, and poor academic performance. Over 80% of U.S. adolescents fail to meet physical activity guidelines, which recommend a minimum of 60 minutes of moderate-to-vigorous-intensity physical activity (MVPA) daily.

Schools play a critical role in promoting physical activity among children through physical education (PE), which helps students gain necessary knowledge, skills, and confidence to practice sports and adopt an active lifestyle. Government policies and regulations profoundly influence local schools' decisions and practices in delivering PE and promoting physical activity among students. In 2000, the White House released a presidential report that identified physical activity and sports engagement among children and adolescents as a national priority and emphasized the importance of PE. The National Association for Sport and Physical Education (NASPE) issued guidelines to help school administrators and teachers deliver PE effectively. Consequently, the majority of U.S. states adopted basic requirements (e.g., frequency, duration, intensity, type and total amount of physical activity) for school PE classes. However, the 2016 Shape of the Nation report identified substantial disparities in state PE requirements and implementation approaches. For example, many states require PE teachers to meet professional credential requirements but few require a minimum PE class time.

Data and Methods

This study assessed the influence of state laws governing PE on weekly PE class attendance among U.S. high school students. Individual-level data of 533,468 high school students were retrieved from the 2003–2017 U.S. national Youth Risk Behavior Survey (YRBS). The PE-related question reads: "In an average week when you are in school, on how many days do you go to PE classes?" Response options ranged from 0 to 5 days. Data on state laws governing PE came from National Cancer Institute's Classification of Laws Associated with School Students (CLASS). Eight distinct categories of state PE policies were scored, with higher scores denoting stronger laws. Individual-level YRBS data were merged with CLASS data based on students' residential state and survey year. State fixed-effect negative binomial regressions were performed, adjusting for individual-level characteristics and YRBS survey design. Each policy type was assessed for its influence on PE attendance.

Results

The PE attendance frequency among high school students averaged 2.1 days per week. Average age was 16 years old. Approximately 62.4% of the students were non-Hispanic white, followed by African American (15.6%), Hispanic (14.7%), and other races (7.3%). Boys and girls accounted for 50.3% and 49.7%, respectively. On average, 14.7% of students were smokers and 12.6% were obese. Regarding state PE policies, laws governing PE class time on average scored 2.5 out of 5, laws governing MVPA time in PE scored 0.47 out of 4, laws governing staffing for PE scored 3 out of 4, laws governing PE curriculum scored 2.5 out of 4, laws governing PE proficiency scored 2 out of 4, laws governing assessment of health-related fitness scored 0.7 out of 4, laws governing recess time scored 0.2 out of 4, and laws governing joint use agreement (between a school and a community partner with the aim of increasing access to school physical activity facilities) for physical activity scored 0.8 out of 4. Both the overall score (sum of scores across all eight laws, ranging from 4 to 19) as well as law-specific scores subtantially differed across states.

Table 1 reports the estimated effects of state laws governing PE on PE class attendance among U.S. high school students. State laws governing PE class time, staffing for PE, PE curriculum, assessment of health-related fitness, and joint use agreement for physical activity were

KEY FINDINGS

- **A one-unit score increase in state laws governing PE class time, staffing for PE, joint use agreement for physical activity, assessment of health-related fitness, and PE curriculum was associated with an increase in weekly PE attendance of 0.30, 0.28, 0.22, 0.20, and 0.13 days, respectively.**
- **A one-unit score increase in state laws governing moderate-to-vigorous-intensity physical activity time in PE, PE proficiency, and recess time was associated with a reduction in weekly PE attendance of 0.25, 0.15, and 0.09 days, respectively.**
- **The associations between state PE policies and PE attendance were stronger for girls than for boys.**

POLICY BRIEF

Results (cont'd)

found to be positively associated with high school students' PE class attendance. A one-unit score increase in state laws governing PE class time, staffing for PE, joint use agreement for physical activity, assessment of health-related fitness, and PE curriculum was associated with an increase in weekly PE attendance of 0.30, 0.28, 0.22, 0.20, and 0.13 days, respectively. In contrast, state laws governing MVPA time in PE, PE proficiency, and recess time were found to be *negatively* associated with high school students' PE class attendance, with a one-unit score increase in state laws governing these aspects being associated with a reduction in weekly PE attendance of 0.25, 0.15, and 0.09 days, respectively.

PE Policy Scores	Average Marginal Effect (95% CI)		
	Entire sample (N=533,468)	Female (N=278,674)	Male (N=254,794)
PE class time	0.30 (0.29, 0.31)	0.40 (0.38, 0.42)	0.24 (0.22, 0.25)
Staffing for PE	0.28 (0.27, 0.28)	0.30 (0.29, 0.31)	0.25 (0.24, 0.26)
Joint use agreement for physical activity	0.22 (0.20, 0.23)	0.29 (0.27, 0.30)	0.16 (0.14, 0.17)
Assessment of health-related fitness	0.20 (0.19, 0.21)	0.22 (0.21, 0.23)	0.18 (0.17, 0.19)
PE curriculum Standards	0.13 (0.12, 0.13)	0.16 (0.15, 0.17)	0.10 (0.09, 0.11)
MVPA time in PE	-0.25 (-0.26, -0.24)	-0.30 (-0.31, -0.28)	-0.20 (-0.21, -0.18)
Recess time	-0.15 (-0.16, -0.13)	-0.16 (-0.17, -0.14)	-0.13 (-0.15, -0.12)
PE proficiency	-0.09 (-0.10, -0.09)	-0.09 (-0.10, -0.09)	-0.09 (-0.09, -0.08)

Compared to boys, weekly PE attendance among girls tended to be more affected by most state PE policies: a one-unit score increase in state laws governing PE class time, staffing for PE, joint use agreement for physical activity, assessment of health-related fitness, and PE curriculum were associated with an increase in weekly PE attendance of 0.40 days among girls and 0.24 days among boys, 0.30 days among girls and 0.25 days among boys, 0.29 days among girls and 0.16 days among boys, 0.22 days among girls and 0.18 days among boys, and 0.16 days among girls and 0.10 days among boys, respectively. In contrast, a one-unit score increase in state laws governing MVPA time in PE was associated with a decrease in weekly PE attendance by 0.30 days among girls and 0.20 days among boys. The effects of laws governing PE proficiency and recess time were not found to differ by sex. In addition, the effects of state PE policies on PE class attendance did not differ much between students with and without obesity (results not shown).

Policy Implications

This study examined the influence of state laws governing PE on weekly PE class attendance among U.S. high school students. Five out of 8 state PE policies were found to be positively associated with high school students' PE class attendance, including state laws governing PE class time, staffing for PE, joint use agreement for physical activity, assessment of health-related fitness, and PE curriculum. However, state laws governing MVPA time in PE, PE proficiency, and recess time were found to be negatively associated with PE class attendance. Although this finding seems surprising, it is likely that while enjoyable PE experience motivates children to actively engage in class, mandatory requirements in PE may manifest students' negative feelings such as anxiety, frustration, or fear. A systematic review documented passive reactance and reduced physical activity level following school-based interventions that mandated students to engage in rigorous-intensity exercises. State laws governing PE proficiency require students to be proficient in specific motor skill development. Mandating fitness tests could raise concerns and anxiety and reinforce peer pressure and a competitive atmosphere among students. Consequently, some students may choose to skip PE to avoid performance assessment. Outside of the PE realm, recess provides additional opportunity for regular physical activity during school hours. Previous work found adequate PE time to be inversely associated with recess and vice versa, indicating that schools replace one form of physical activity for another rather than providing the recommended amount of both PE and recess. Moreover, the impacts of most state PE policies on PE class attendance were larger among girls than among boys. Gender differences in policy response were reported in previous studies, which documented a stronger impact of school-based interventions on physical activity level among girls than among boys. One possible explanation is that girls are less likely to take PE as an elective course than boys, so that mandatory PE participation may increase girls' PE time more significantly than boys.

State PE policies can enhance children's physical activity engagement, but their success is highly dependent upon the type of policy enacted as well as the degree of school district compliance. Large disparities in implementation and variations in the quality of PE delivery across schools and school districts may undermine the intended policy impact. Some of the major challenges to implement state PE policies included, but were not limited to, lack of time in the school day, teacher participation, quality of facilities, and concerns about academics. Effectively addressing those implementation challenges may hold the potential to capitalize on the societal gains of state PE policies.

For more information, see published article in American Journal of Health Promotion: An R, Ji M, Clarke C, Guan C. Impact of state laws governing physical education on attendance among U.S. high school students, 2003-2017. American Journal of Health Promotion. 2019. https://doi.org/10.1177/0890117119858016

This project was supported by the USDA Hatch Act Funds.

Center for Health Economics and Policy
INSTITUTE FOR PUBLIC HEALTH AT WASHINGTON UNIVERSITY