

Prevalence of School Policies, Programs, and Facilities That Promote a Healthy Physical School Environment

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The physical environment in schools is receiving increased national attention. Several federal efforts to improve school environments have been implemented during the past 5 years. In 1997, President Clinton created the Task Force on Environmental Health Risks and Safety Risks to Children.¹ On April 18, 2003, President Bush signed an executive order to extend the work of the task force through 2005.² Cochaired by the administrator of the Environmental Protection Agency and the secretary of the Department of Health and Human Services, the task force is charged with identifying and developing federal strategies to protect children from environmental health threats.¹

In October 2001, the task force created a Schools Workgroup to explore ways for federal departments and agencies to expand cooperation to improve school environmental health. The Schools Workgroup's goals are to improve children's health and school performance by making existing and new schools healthier places to learn, and to ease the burden on underfunded and overextended school districts and schools by improving coordination and collaboration among federal, state, and local programs.

This improved coordination and collaboration comes at a critical time for schools. The average child spends about 1300 hours in a school building each year; teachers and other employees spend even more time.³ Today, the average school building is about 42 years old; more than 75% of America's schools were built before 1970.⁴

More than 45 million elementary and secondary students attend approximately 86 000 public schools in the United States.⁵ The number of students in kindergarten through twelfth grade is projected to reach 54.2 million by 2009.⁶ It is estimated that 6000 new schools will be needed by 2007 to accommodate increasing enrollments, and thousands more schools will be needed later.⁷

Objectives. We examined the extent to which schools in the United States have health-promoting policies, programs, and facilities.

Methods. We analyzed data from the School Health Policies and Programs Study 2000.

Results. We found that public schools (vs private and Catholic schools), urban schools (vs rural and suburban schools), and schools with larger enrollments (vs smaller schools) had more health-promoting policies, programs, and facilities in place. On average, middle schools had 11.0 and middle/junior and high schools had 10.4 out of a possible 18 policies, programs, and facilities.

Conclusions. Although some schools had many healthy physical environment features, room for improvement exists. Resources are available to help schools improve their health-promoting policies, programs, and facilities. (*Am J Public Health.* 2003;93:1570–1575)

Unfortunately, about one third of schools, affecting about 14 million students, report needing extensive repair or replacement of 1 or more buildings.⁸ About one half of schools report at least 1 “unsatisfactory environmental condition,” such as poor ventilation, heating or lighting problems, or poor physical security.⁸ These unsatisfactory environmental conditions are most often reported in urban schools, in schools with a high minority student enrollment, and in schools with a high percentage of low-income students.^{9–11}

Decisions about where a school is built, how the building is designed, how the school is maintained, and what school policies and programs are implemented have important implications for the health and learning potential of children who spend time in the school. *Healthy People 2010* sets public health objectives for the nation to achieve by 2010.¹² Objective 8-20 specifically focuses on the school setting: “Increase the proportion of the Nation's primary and secondary schools that have official school policies ensuring the safety of students and staff from environmental hazards, such as chemicals in special classrooms, poor indoor air quality, asbestos, and exposure to pesticides.”^{12(p8-26)}

No study has comprehensively assessed the extent to which schools have health-promoting policies, programs, and facilities. However,

the School Health Policies and Programs Study (SHPPS) 2000, conducted by the Centers for Disease Control and Prevention (CDC), provided data on physical and tangible features of school buildings and on policies that promote a physically and socially healthy built environment. In this study, we analyzed data from SHPPS 2000 to examine the extent to which schools in the United States have health-promoting policies, programs, and facilities.

METHODS

SHPPS 2000 assessed programs and policies on 8 components of the school health program at the state, district, and school levels. This report summarizes selected school-level data only; state- and district-level results are reported elsewhere.¹³ School-level data were collected from a nationally representative sample of public and private elementary, middle/junior high, and senior high schools.

Questionnaire development took 2 years and included extensive literature reviews; expert panel meetings; reviews by representatives of federal agencies and national organizations; cognitive testing with school, district, and state education agency volunteers; and a formal field test of 4 questionnaires. In conjunction with the administration of SHPPS

2000, a test–retest substudy was designed and implemented to assess data quality.¹⁴ SHPPS 2000 data were generally of high quality. Among the 99 categorical and ordinal questions selected from across all school-level questionnaires, 5% exhibited almost perfect reliability ($\kappa > 80\%$), 41% exhibited substantial reliability ($\kappa > 60\%$), 42% exhibited moderate reliability ($\kappa > 40\%$), and 11% exhibited poor reliability ($\kappa \leq 40\%$).¹⁴

The SHPPS 2000 questionnaires relevant to this study assessed physical education and activity, health services, mental health and social services, food service, and school policy and environment. These data were then linked with extant data on school characteristics from the Quality Education Data (QED) database.¹⁵ QED variables included in this analysis were school type (public, private, or Catholic), urbanicity (urban, suburban, or rural), school enrollment size, discretionary per-pupil expenditure, percentage of White students, and percentage of college-bound students.

School-level data were collected by computer-assisted personal interviews. During recruitment, the principal or other school-level contact designated, for each component, a faculty or staff respondent who had primary responsibility for, or was the most knowledgeable about, that component. All interviews were completed between January and June 2000. Smith et al. have provided a detailed description of SHPPS 2000 methodology.¹⁶

Response rates for the interviews varied by school health program component. The response rate for physical education and activity was 69% ($n=921$); for health services, 71% ($n=938$); for mental health and social services, 67% ($n=876$); for food service, 70% ($n=841$); and for school policy and environment, 70% ($n=927$). We compared the characteristics of responding schools (schools that completed at least 1 of the 7 SHPPS 2000 school-level interviews) with those of nonresponding schools (schools that did not complete any interviews). Participation varied by school type ($\chi^2 = 103.3$; $P < .01$). Of the schools that responded, 83% were public, 11% were private, and 7% were Catholic. Of the schools that did not respond, 53% were public, 37% were private, and 9% were Catholic.

Responding schools also were significantly larger (mean enrollment: 550 in responding schools vs 404 in nonresponding schools; $t=4.5$; $P < .01$) and had a higher percentage of White students enrolled (56% in responding schools vs 32% in nonresponding schools; $t=10.5$; $P < .01$). Participation did not vary by school level (elementary, middle/junior high, or senior high), urbanicity, percentage of college-bound students, or discretionary per-pupil expenditure.

All analyses used SUDAAN (Research Triangle Institute, Research Triangle Park, NC) to account for the complex sample design in SHPPS 2000; results are based on weighted data. The selection of policies, programs, and facilities for this analysis was based primarily on CDC guidelines.^{17–20} To determine whether the prevalence of each of these policies, programs, and facilities varied by school level, we conducted χ^2 analyses (the significance level was set at $P < .01$ to account for multiple comparisons).

The following policy, program, and facility variables were used to examine unintentional injury and violence prevention: (1) requires uniforms or dress code (students must wear school uniforms or there is a dress code), (2) uses communication devices (during the school day, the school staff uses communication devices, such as cell phones, 2-way radios, walkie-talkies, or intercoms), (3) designates a weapons-free school zone (the school posts signs marking a specified distance from school grounds in which weapons are not allowed), (4) participates in a “safe passages” program (school has safe routes to school so students do not have to go through dangerous areas), and (5) has performed all appropriate inspection and maintenance of facilities and equipment (school buses and other vehicles; playground facilities and equipment; indoor and outdoor athletic facilities and equipment; environmental hazards, such as asbestos, pesticides, and laboratory chemicals; school kitchen facilities and equipment; special classrooms, such as chemistry labs and workshops; smoke detectors; fire extinguishers; and indoor and outdoor lighting) and uses the Consumer Product Safety Commission checklist for playground safety (safety checklist and equipment guidelines).²¹

Variables used to examine tobacco, alcohol, and other drug use policies, programs, and facilities included (1) prohibits all tobacco use (by students, all school staff, and visitors on school property, in school vehicles, and at school-sponsored functions away from school property), (2) prohibits tobacco advertising (in the school building, on school grounds, on school buses, in school publications, and through sponsorship of school events), (3) designates a tobacco-free school zone (school posts signs marking a tobacco-free school zone), and (4) designates a drug-free school zone (school posts signs marking a drug-free school zone).

Variables used to examine nutrition and dietary policies, programs, and facilities included (1) does not have “junk food” (food that provides calories primarily through fats or added sugars and has minimal amounts of vitamins and minerals) available before or during school hours, (2) does not have a soft drink contract or does not allow soft drink advertising (in the school building, on school grounds, or on school buses), (3) does not promote junk food (school does not promote consumption of candy, meals from fast-food restaurants, or soft drinks through posters or displays; advertisements on textbook covers, on school food service menus, or in the school newsletter, newspaper, or other publication; coupons for free or reduced prices on those products; or sponsorship of school events), (4) has a cafeteria, and (5) operates cafeteria at or below capacity at peak meal-times (100% full or less).

Finally, variables used to examine health services, mental health and social services, and physical activity policies, programs, and facilities included (1) has a sickroom (nurse’s office or other area reserved for providing standard health services), (2) has supplies for universal precautions (in all classrooms, in gymnasiums, on playgrounds, on playing fields, and on school buses or other vehicles used to transport students), (3) has a private room for providing mental health and social services, and (4) has any indoor or outdoor facilities for physical education.

Except for the variable assessing compliance with playground safety guidelines (because that question was asked only of elementary schools), the variables measuring

school health policies, programs, and facilities were combined in an index. The index provides a count of the policies, programs, and facilities in place; each school, therefore, received a score between 0 and 18. This score, referred to as the school's "policy, program, and facility" score, was used as the dependent variable in regression models.

Preliminary analyses indicated that pairwise correlations among the independent variables (the QED variables) were all less than or equal to .27; thus, we included all independent variables in the regression model. The full model was overspecified. Although pairwise correlations analysis will not diagnose collinearity between a given independent variable and a linear combination of a subset of other independent variables, more robust multicollinearity diagnostics were not possible. Because of this limitation, it was necessary to run separate models, each with independent variables that were conceptually related.

The first regression model included the following independent variables: school level (elementary vs middle/junior high vs senior high), school type (public vs private vs Catholic), urbanicity (urban vs suburban vs rural), and school enrollment size (included as a continuous variable). The second model included school level plus 2 continuous independent variables: discretionary per-pupil expenditure and percentage of White students in the school. Because the percentage of college-bound students was assessed only at the high school level, the third model—which included discretionary per-pupil expenditure, percentage of White students, and percentage of college-bound students as independent continuous variables—was run for high schools only.

RESULTS

The percentage of schools that inspected and provided appropriate maintenance to their equipment and facilities is shown in Table 1. More than 80% of schools performed each type of inspection and maintenance, with most types being performed by more than 95% of schools. Because of the lack of variability among these types of inspection and maintenance, they were com-

TABLE 1—Percentage of Schools That Inspected and Provided Appropriate Maintenance to Equipment and Facilities During the 12 Months Preceding the Study: School Health Policies and Programs Study, 2000

Type of Policy	Schools (%)
Fire extinguishers	99.3
Inspection or maintenance of halls, stairs, and regular classrooms	96.6
Inspection or maintenance of indoor athletic facilities and equipment	95.5
Inspection or maintenance of kitchen facilities and equipment	96.6
Inspection or maintenance of outdoor athletic facilities and equipment	94.8
Inspection or maintenance of playground facilities or equipment ^a	94.8
Inspection or maintenance of school buses or other vehicles used to transport students	98.4
Inspection or maintenance of special classroom areas (e.g., chemistry labs, workshops, art rooms)	80.8
Lighting inside of the buildings	97.5
Lighting outside of the buildings	94.6
Protection of students and staff from environmental hazards	94.4
Smoke detectors	85.2

^aAmong elementary and middle/junior high schools only.

bined into a single variable that indicated whether the school performed all of these types of inspection and maintenance.

For each school level, the prevalence of each policy, program, and facility related to a healthy physical school environment, including the combined inspection and maintenance variable just described, is shown in Table 2. Although many of the policies, programs, and facilities were equally likely to be in place at all school levels, the analysis revealed a few exceptions. For example, senior high schools were the most likely to have performed appropriate inspections and maintenance in the 12 months preceding the study. Middle/junior high schools were more likely than elementary schools to require uniforms or a dress code. In addition, elementary schools were

the most likely, and senior high schools the least likely, to limit the availability of junk food to students through vending machines, canteens, and school stores. Similarly, elementary schools were the most likely, and senior high schools the least likely, to prohibit soft drink advertising or to not have a soft drink contract.

The distribution of policy, program, and facility scores for each school level is shown in Table 3. Elementary schools had a mean of 11.0 (95% confidence interval [CI]=10.6, 11.4) policies, programs, and facilities in place; middle/junior high schools had a mean of 10.4 (95% CI=10.0, 10.8); and senior high schools had a mean of 10.4 (95% CI=10.1, 10.7). No school had all 18 of these policies, programs, and facilities in place, and fewer than 10% of schools at any level had 15 or more in place.

Regression analysis indicated that school level was significantly associated with the policy, program, and facility score, with elementary schools having significantly higher scores than senior high schools ($\beta=0.6$; $P=.02$). On the basis of this finding, school level was included as a control variable in subsequent analyses. The first regression model (including school type, urbanicity, and school size as independent variables) revealed that the policy, program, and facility score was significantly associated with each of the independent variables. Specifically, Catholic schools ($\beta=-2.2$; $P<.0001$; mean score=9.3) and private schools ($\beta=-3.9$; $P<.0001$; mean score=7.4) had significantly lower scores than did public schools (mean score=11.7). In addition, rural schools ($\beta=-0.6$; $P=.05$; mean score=10.5) and suburban schools ($\beta=-0.4$; $P=.04$; mean score=10.5) had significantly lower scores than did urban schools (mean score=11.2). School size was positively associated with score, indicating that the larger the school, the higher its score ($\beta=.001$; $P<.001$).

The second and third regression analyses did not reveal any statistically significant associations among policy, program, and facility score and the percentage of White students, the school's discretionary per-pupil expenditure, or, among high schools, the percentage of college-bound students (all $P\geq .2$).

TABLE 2—Percentage of Elementary, Middle/Junior High, and Senior High Schools With Policies, Programs, and Facilities Related to a Healthy Physical School Environment: School Health Policies and Programs Study, 2000

Policies, Programs, and Facilities	Elementary Schools (%)	Middle/Junior High Schools (%)	Senior High Schools (%)	χ^2
Has performed all appropriate inspection and maintenance of facilities and equipment ^a	35.7	40.3	56.8	24.9**
Requires uniforms or dress code	82.1	93.5	88.3	19.6**
Uses communication devices	80.7	78.0	80.1	0.6
Designates a weapons-free school zone	24.4	21.2	25.8	2.4
Has a safe passages program	16.4	13.0	8.1	10.9*
Prohibits all tobacco use	47.8	41.9	49.4	3.4
Prohibits tobacco advertising	91.3	91.1	91.2	0.01
Designates a tobacco-free school zone	43.2	38.6	46.5	3.3
Designates a drug-free school zone	53.3	48.1	49.4	1.7
Uses Consumer Product Safety Commission checklist for playground safety ^b	47.8
Does not have junk food available before or during school hours	60.9	34.4	5.7	180.8**
Does not have a soft drink contract or does not allow soft drink advertising	88.2	77.2	56.4	72.2**
Does not promote junk food	66.2	65.8	59.3	3.8
Has a cafeteria	88.6	91.7	93.6	3.3
Cafeteria operates at or below capacity at peak mealtimes	98.5	96.0	92.6	11.9*
Has a sickroom	84.8	75.4	78.6	8.6*
Has supplies for universal precautions	36.9	34.6	36.8	0.5
Has a private room for providing mental health and social services	90.7	88.7	96.2	12.1*
Has any indoor or outdoor facilities for physical education	100.0	100.0	99.6	1.0

^aSee Table 1 for types of inspection and maintenance included in this variable.

^bNot included in index.

* $P < .01$; ** $P < .0001$. P values are 2-tailed.

TABLE 3—Distribution of Policy, Program, and Facility Scores Related to a Healthy Physical School Environment, by School Level: School Health Policies and Programs Study, 2000

Policy, Program, and Facility Score ^a	Elementary Schools (%)	Middle/Junior High Schools (%)	Senior High Schools (%)
1	0.5	0.6	0.0
2	1.0	0.6	0.7
3	0.4	0.0	0.6
4	1.3	3.2	0.7
5	3.8	1.8	1.6
6	4.9	3.0	2.1
7	2.3	6.5	5.4
8	7.2	7.3	11.0
9	6.9	13.8	15.5
10	7.9	11.0	9.9
11	11.2	12.7	18.6
12	15.6	15.7	10.3
13	17.9	11.2	14.4
14	10.3	7.8	6.1
15	5.0	3.4	1.8
16	2.3	1.4	1.4
17	1.6	0.0	0.0
18	0.0	0.0	0.0

^aThe policies, programs, and facilities examined in this study (see Table 2) were combined into an index counting the number of policies and programs in place. Each school received a policy and program score between 0 and 18.

DISCUSSION

The policies and programs that a school chooses to adopt and the physical environment it maintains are important aspects of the school environment that promote health, safety, and learning among students. This study examined various physical features of school buildings as well as policies and programs that influence the physical nature of the school in a variety of areas, including violence and unintentional injury; alcohol, tobacco, and other drug use; nutrition and dietary behaviors; health services; mental health and social services; and physical activity and fitness.

Whereas SHPPS 2000 examined other features of the physical school environment, the policies, programs, and facilities examined in this analysis were limited to those recommended in literature such as the CDC guidelines for school health programs.

For example, the CDC *School Health Guidelines to Prevent Unintentional Injuries and Violence*¹⁷ advocates conducting regular safety and hazard assessments of the building facility and equipment, and, for elementary schools, using the Consumer Product Safety Commission playground safety checklist,²¹ which can be used to ensure that playground equipment is safely maintained. Only

57% of senior high schools and less than 50% of elementary and middle/junior high schools reported performing all appropriate inspection and maintenance of facilities and equipment. Fewer than one half of elementary schools reported using the Consumer Product Safety Commission playground safety checklist. SHPPS 2000 did not examine the reasons for deficits in inspections and maintenance; however, it may be that tight school budgets are contributing to understaffing or inadequate repair budgets. These data are not surprising, given that the US General Accounting Office found that about one third of schools reported needing extensive repair or replacement of 1 or more buildings.⁸

The CDC *Guidelines for School Health Programs to Prevent Tobacco Use and Addiction*

supports the prohibition of tobacco product use and advertising on school grounds.¹⁸ Such policies not only prevent exposure of students and staff to environmental tobacco smoke but also create an environment that supports non-smoking and a student's decision not to smoke.¹⁸ By analogy, drug-free school zones were included in this analysis as well. Although 9 of 10 schools prohibit tobacco advertising, far fewer schools prohibit all tobacco use among students, teachers, staff, and visitors and specifically designate a tobacco-free and drug-free school zone.

This analysis found that most schools had a cafeteria that could accommodate students during mealtimes; however, far fewer schools, especially senior high schools (6%), reported that junk food was unavailable to students during school hours. These data are relevant to national concern regarding the increasing obesity epidemic among youth. Results from the 1999–2000 National Health and Nutrition Examination Survey indicate that an estimated 15% of children and adolescents aged 6 to 19 years are overweight.²² School-based environmental strategies to promote physical activity and healthy eating are important in addressing this problem.²³ As described in the CDC *Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People*¹⁹ and *Guidelines for School Health Programs to Promote Lifelong Healthy Eating*,²⁰ school cafeterias that allow children to eat in comfortable surroundings, school policies that promote healthy eating and provide healthy choices, and opportunities for physical activity during the school day are critical environmental elements for addressing obesity among youth.^{19,20,23,24}

Most schools reported that they had a sick-room for providing standard health services for students and a private room for providing mental health and social services. However, only about one-third of schools reported that they had supplies for universal precautions in all classrooms, in gymnasiums, on playgrounds, on playing fields, and on school buses or other vehicles used to transport students. Research has shown that whereas most (77%) schools have a part- or full-time school nurse who provides health services to students at the school, those school nurses are present for only an average of 22 hours per

week.²⁵ Consequently, it is likely that some student injuries will occur when a school nurse is unavailable. If supplies for universal precautions were widely available to teachers and staff, they would be better able to protect themselves and students in the event of an emergency.

Other research suggests that urban schools, schools with a high minority student enrollment, and schools with a high percentage of low-income students are more likely to experience unsatisfactory school environmental conditions, such as poor ventilation, heating or lighting problems, or inadequate physical security.^{8–11} Our analysis found contrary results for the particular environmental variables investigated in our study; that is, urban schools were implementing more environmental policies and programs and had more facilities. In addition, the percentage of White students, the school's discretionary per-pupil expenditure, and, among high schools, the percentage of college-bound students were not indicative of a more health-promoting physical environment as measured in this study. This analysis also found that elementary schools were more likely than senior high schools, public schools more likely than private and Catholic schools, and larger schools (i.e., those with higher enrollment) more likely than smaller schools to adopt more policies and programs or to have these facilities. However, these data do not provide insight into the reasons for these differences. It is not clear, for example, whether schools with lower policy, program, and facility scores fail to perceive a need for these school features, have less oversight, or lack the financial or human resources to implement the policies and programs.

This study has at least 3 important limitations. First, SHPPS 2000 was not designed to investigate fully all aspects of the physical school environment, and some important data on this topic are absent. For example, recent reports suggest that daylighting in schools²⁶ and indoor air quality issues²⁷ are linked to school attendance and student performance, but these variables were not examined in SHPPS 2000. Second, the school demographic variables we used might not fully capture the characteristics of a school. For example, the percentage of college-bound students

is just 1 measure of the level of student achievement in the school. Third, these data are cross-sectional and do not allow us to infer causality.

Although schools are implementing some important school building policies and programs and have important facilities in place, room for improvement exists. On average, elementary schools had 11.0 and middle/junior and senior high schools had 10.4 out of a possible 18 policies, programs, and facilities examined in this study. The CDC's school health guidelines provide guidance to personnel and policymakers at the school, district, state, and national levels on unintentional injuries and violence,¹⁷ tobacco use and addiction,¹⁸ physical activity,¹⁹ and healthy eating.²⁰ These guidelines include a school environment component. To help put the recommendations included in these guidelines into action, the CDC also developed the School Health Index, a self-assessment and planning guide that enables schools to identify the strengths and weaknesses of their health promotion policies and programs; develop an action plan for improving student health; and involve teachers, parents, students, and the community in improving school services.²⁸ The results of the analyses presented in this article suggest that many schools could benefit from these resources. ■

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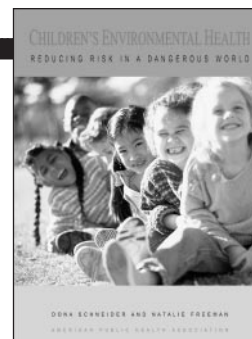
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The centers for Disease Control and Prevention's institutional review board determined the School Health

Policies and Programs Study 2000 to be exempt from review.

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Children's Environmental Health

By Dona Schneider and
Natalie Freeman

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