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Physical Activity Opportunity in United States Public Elementary Schools

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Recent evidence indicates that many elementary schools have curtailed recess and Physical Education (Morrow, Jackson & Payne 1999). These finding are at variance with the goal of Healthy People 2010 to increase physical activity. The purpose of this study was to examine physical activity opportunities (PAO) in U.S. public elementary schools. Survey data obtained from the National Center for Education Statistics were analyzed using within grade (1-5 or 6) between group comparisons. Key findings included: a) PAO decreased from 222 to 204 minutes/week for grades 1 to 5; b) schools with smaller enrollments (<300 pupils) provided more PAO than schools in all larger categories (p<. 01); c) schools in rural areas provided more PAO than schools in towns, suburbs, and cities (p<. 01); d) schools with a low minority enrollment (<6%) provided more PAO than did schools with very high minority enrollment (>50%) (P<. 01); and e) schools with fewer children enrolled in free/reduced price lunch (<35%) afforded more PAO than did schools with the highest rates (>75%) (P<. 01).

The obesity epidemic in the U.S. is now impacting elementary school aged children (National Center for Health Statistics, 2006, May). In fact, the prevalence of obesity (BMI °Ÿ 95th percentile) among children ages 6-11 years has tripled in the past quarter century (Centers for Disease Control and Prevention [CDC], n.d.). At 19 percent, this is nearly four times the Healthy People 2010 (2000) obesity prevalence target of 5 percent. Increasingly, younger children are at risk for the well-known consequences of excess weight, e.g., heart disease, diabetes, cancer and related psychosocial problems including low self-esteem, peer rejection and discrimination. This disturbing trend has fostered comprehensive, multi-disciplinary efforts to end childhood obesity. Although genetics, behavioral, cultural, social, physiological and environmental factors are known contributors to obesity (Healthy People 2010, 2000), weight gain is essentially a result of too few calories expended relative to those consumed (Brock et al., 2009).

Because children's physical activity is readily modifiable, scientific consensus now points to the output side of the caloric equation (CDC, n.d.). In consequence, government and professional agencies have established a physical activity guideline of 60 minutes a day for children (United States Department of Health Human Services [USDHHS], 2008; National Association for Sport and Physical Education [NASPE], 2004). Studies cited by Patterson and van der Mars (2008) indicate that children establish lifetime patterns of physical activity during their elementary school years. Therefore, energy expenditure is an area where elementary schools can have substantial impact. In fact, Lee, Burgeson, Fulton, and Spain (2007) reported that 75 percent of elementary schools surveyed had established goals or targets to increase physical activity. Although similar targets exist across the USA, the extent to which they have been effectively implemented remains uncertain. For instance, Morrow et al., (1999) found that many elementary schools have curtailed recess and PE to allow more time for academics. The authors were critical of this trend, citing evidence that PE does not adversely impact academics, even when academic time is reduced to allow more PE. Moreover, Lounsbery, Bungum, and Smith (2007) found that time allotted to physical activity decreases as children progress through grades K-12.

A related concern is the issue of civil rights and physical activity. Investigators have found that children who are members of minorities, and those from lower socioeconomic groups, had fewer opportunities to engage in physical activity at school (Powell, Slater, & Chaloupka, 2004; Simons-Morton, et al., 1997). These findings are buttressed by CDC (n.d.) data that reveal disparities among racial/ethnic groups in obesity prevalence. The implications of these reports are troubling given the mission of public schools to provide equal opportunity for all children. Equal opportunity may be further impeded by a school's enrollment size, geographical region, and locale. Although Simons-Morton, et al. (1997) reported disparities in children's physical activity among four states, scientific consensus regarding PAO based on school characteristics is quite limited. Consequently, there is a need to clarify how United States public schools have responded to the aforementioned issues; that is, to what extent do schools actually provide opportunities for all children to be physically active?

Information of this nature could potentially inform public policy, promote equality and direct limited resources to areas of greatest need.

The purpose of this study was to examine physical activity opportunities (PAO) during the school day (minutes of PE and recess) for children in elementary grades (1-5 or 6) in United States

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public schools. It was hypothesized that PAO would decrease across grade levels, and that minority children, and children with lower SES, would have fewer opportunities for physical activity. It was further hypothesized that disparities in PAO would exist by geographical location and locale.

Method

Design

The design of this study was cross-sectional and survey. Data were obtained from the National Center for Educational Statistics (NCES). Officials from a geographically representative sample of United States public elementary schools (N=1055) completed a questionnaire on foods and physical activity designed and administered by NCES (Fast Response Survey System—Foods and physical activity in public elementary schools, 2005). The nationally representative sampling frame of 50,980 regular elementary schools selected by NCES from the 2002-03 Common Core of Data Public School Universe File was stratified by enrollment size and percent of children eligible for free or reduced-price lunch. Schools within the frame were further categorized by locale and region.

Procedure

The Foods and Physical Activity in Public Elementary Schools: 2005 Survey was sent to each of the 1,161 eligible sample schools, with the request that it be completed by the person most knowledgeable about the availability of foods and opportunities for physical activity at the school. Schools were assured that survey responses would be kept confidential; therefore, survey results were not reported on a state-by-state basis. Of the 1,055 completed surveys (91% return rate), 19% were completed by Web, 53% by mail, 27% by fax and 1% by telephone. A pretest questionnaire and telephone follow-up for missing or inconsistent survey items was used to minimize non-sampling error (NCES, 2006). (Note: respondents were asked to provide information for each grade that was considered elementary level at their school, typically grades 1 through 5 or 6.)

Table 1. ***Means (unweighted) and Standard Deviations for Minutes Per Week of Scheduled Recess and Physical Education (combined) at Public Elementary Schools.***

School characteristic	Grade 1	Grade 2	Grade 3
All public elementary schools	222.28 (81.63)	220.74 (80.33)	217.39 (81.53)
Enrollment size			
Less than 300	242.42 (85.40)	240.51 (84.03)	238.75 (86.99)
300 to 499	218.09 (79.31)	215.46 (77.33)	212.55 (76.61)
500 or more	210.82 (77.94)	210.30 (77.31)	206.14 (78.41)
School locale			
City	200.26 (86.27)	197.80 (83.65)	197.92 (86.42)
Urban fringe	219.56 (75.89)	219.10 (75.54)	215.66 (77.82)
Town	230.37 (75.73)	227.75 (72.99)	223.69 (74.97)
Rural	244.96 (79.63)	243.37 (78.69)	237.28 (78.33)
Region			
Northeast	193.13 (66.68)	192.92 (64.67)	191.13 (65.18)
Southeast	185.73 (70.93)	185.07 (70.91)	180.20 (71.29)
Central	226.12 (82.79)	223.16 (81.83)	218.54 (79.70)
West	256.22 (79.07)	254.45 (77.42)	252.90 (81.29)
Percent minority enrollment			
Less than 6 percent	235.71 (77.46)	234.00 (77.76)	229.57 (76.70)
6 to 20 percent	234.10 (78.11)	232.43 (77.66)	227.33 (76.48)
21 to 49 percent	227.22 (70.09)	225.40 (68.68)	223.27 (71.50)
50 percent or more	204.43 (90.32)	203.02 (87.74)	201.21 (91.65)
Percent of studentseligible for free or reduced-price lunch			
Less than 35 percent	234.14 (72.29)	233.92 (72.23)	230.36 (71.67)
35 to 49 percent	233.27 (73.27)	231.88 (73.13)	225.44 (73.48)
50 to 74 percent	229.72 (80.38)	225.93 (76.06)	221.33 (78.65)
75 percent or more	192.33 (92.06)	190.78 (91.12)	190.93 (94.93)

NOTE: Respondents provided information for each grade considered elementary at the school, typically 1-5 or 6

Adapted from Calories In, Calories Out: Food and Exercise in Public Elementary Schools, 2005

Table 1 continued.

School characteristic	Grade 4	Grade 5	Grade 6
All public elementary schools	211.11 (78.35)	209.05 (79.80)	215.97 (89.39)
Enrollment size			
Less than 300	230.72 (82.03)	230.44 (87.58)	240.47 (94.58)
300 to 499	205.95 (75.85)	202.05 (74.34)	201.30 (78.32)
500 or more	201.41 (75.27)	199.58 (75.35)	197.41 (83.72)
School locale			
City	192.46 (81.03)	192.73 (79.73)	186.35 (91.72)
Urban fringe	211.38 (75.00)	209.81 (76.13)	215.65 (74.63)
Town	213.76 (78.14)	204.21 (76.06)	181.56 (76.74)
Rural	228.88 (75.82)	227.15 (81.88)	240.35 (92.09)
Region			
Northeast	188.48 (64.58)	185.06 (62.00)	188.75 (72.06)
Southeast	176.76 (65.52)	176.03 (65.61)	201.34 (86.46)
Central	208.74 (77.57)	201.08 (75.13)	188.07 (84.33)
West	244.94 (78.86)	245.82 (83.64)	249.93 (88.51)
Percent minority enrollment			
Less than 6 percent	224.34 (74.86)	218.33 (82.70)	221.13 (96.86)
6 to 20 percent	222.57 (76.13)	222.55 (74.98)	236.86 (69.27)
21 to 49 percent	215.34 (68.02)	212.46 (71.17)	232.44 (78.15)
50 percent or more	194.38 (85.71)	194.56 (84.96)	193.10 (96.81)
Percent of studentseligible for free or reduced-price lunch			
Less than 35 percent	223.81 (69.85)	220.78 (69.60)	227.58 (72.60)
35 to 49 percent	220.92 (69.41)	217.95 (68.54)	231.15 (64.73)
50 to 74 percent	213.05 (74.71)	209.36 (75.70)	232.35 (82.51)
75 percent or more	186.22 (91.25)	188.85 (96.27)	182.24 (112.03)

NOTE: Respondents provided information for each grade considered elementary at the school, typically 1-5 or 6

Adapted from Calories In, Calories Out: Food and Exercise in Public Elementary Schools, 2005

Analysis

The Statistical Package for Social Sciences (SPSS), Version 11 was applied to analyze the data, using within-grade, between-group comparisons. Preliminary analyses, including means and standard deviations, were reported for all variables; see Table 1. One-way ANOVA's were then calculated for each grade level's reported PAO, i.e., minutes of PE plus minutes of recess/week, by enrollment size, geographic region, school locale (rural, city, etc.), pupil SES, and percent of minority pupils. The Scheffe procedure was used to make post hoc comparisons. Table 2 provides a regional breakdown by states.

Results

Six principal findings emerged: a) PAO decreased from 222 to

Table 2. ***States by Geographic Region***

Northeast:	Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont
Southeast:	Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia
Central:	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin
West:	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington and Wyoming

209 min./week from grades 1 to 5 for the entire sample; however, minutes of PE increased from 86 to 99 min./week from grades 1 to 6; b) schools with smaller enrollments (<300) provided more PAO than schools in all larger enrollment categories (p<. 01); c) schools in rural areas provided more PAO than schools in towns, suburbs and cities (p<. 01); d) schools in the Western U.S. provided more PAO than schools in Southeast, Northeast, and Central U.S. (p<.01); e) schools with a low minority enrollment (<6%) provided more PAO than schools with very high minority enrollment (>50%) (p<. 01); and f) schools with fewer children (<35%) participating in free/ reduced price lunch programs afforded more PAO than schools with the largest participation rates (>75%) (p<. 01).

Discussion

The results of this study indicate an overall decrease in PAO from grades 1 to 5 among U.S. public elementary schools. While policies, legislation and government guidelines (Healthy People 2010, USDHHS 2008, American Heart Association, 2009) are promoting increased physical activity, public schools are decreasing opportunities for young children to be physically active during the school day. Whether due to lack of resources, competing academic standards or other factors, reduction in PAO is problematic with regard to children's health.

The decrease in PAO across grade levels 1-5 in the present national sample is consistent with reports for individual states. For instance, Lounsbery et al.(2007) found that opportunities to participate in physical activity during the school day in Nevada declined as students progressed through public school grades K-12. This finding is noteworthy because a state's prevalence of childhood obesity is linked to insufficient physical activity (Brock, et al., 2009). However, despite an overall decrease in PAO across grade levels 1-5, present results show an increase in PE time across grade levels 1-6. Possibly, schools are de-emphasizing recess time in favor of a more structured setting (PE) that fosters opportunity for greater active participation at moderate to vigorous levels. Physical Education also provides students with information to make sound decisions regarding their physical activity.

Present data reveal an average PAO of 42 to 44 minutes per school day. These results indicate that public elementary schools fall well short of the USDHHS (2008) and NASPE (2004) guidelines of 60 minutes or more of daily physical activity, during customary school hours. Remaining minutes must therefore be obtained outside the 6-hour school day. This target may be difficult to achieve for children in school systems where PAO is adversely impacted by SES and minority status (Powell et al., 2004). Furthermore, limited opportunities for PA at school are not necessarily compensated for after school. D. Dale, Corbin, and K.S. Dale (2000) found that third and fourth grade children did not make-up for a sedentary school day by increasing their PA levels after school.

Notwithstanding efforts by state and Federal governments to ensure equality of opportunity in education, there remains work to be done in providing equal opportunities for all children to engage in sufficient PA. The present data indicate the existence of differences in PAO according to school enrollment, size, and locale. Additional differences were associated with social class, region, and minority status. These findings are disturbing considering societal expectations that public schools provide equal opportunities for all children.

Although there is a paucity of current research with respect to the effects of social class, location and minority status on PAO for elementary aged children, our results are consistent with findings on physical activity. For instance, Simons-Morton et al. (1997) found that third graders in California were more active than those in Louisiana, Minnesota and Texas. Furthermore, White third graders in these four states were more active than Hispanic, Black or children of other ethnicities. Therefore, it appears that progress towards equality in PAO for all children remains elusive.

Additional work is needed to determine if current national efforts related to physical activity are effective. Such information could influence policy at the district, state, and national levels to ensure all children in US public schools receive adequate and equal opportunity for physical activity. Further investigations should continue to monitor national efforts aimed at increasing physical activity among elementary-aged school children. Such information could potentially influence public opinion regarding proposed legislation e.g., Fit Kids Act. This legislation aims to ensure kids are active during the school day, and are educated about diet and exercise (American Heart Association, 2009).

Additional studies should likewise examine: a) reasons for decrease in PAO with increased grade level; b) root causes of social and geographical inequities in PAO; c) extent to which children are physically active during unstructured PAO; d) PAO during the school day for children beyond the elementary years; and e) feasibility of before and after school programs to increase physical activity. In the meantime, elementary schools can take initiatives to increase physical activity. For instance, The University of Illinois' ScienceDaily (2008) recommends providing students with opportunities to be active beyond recess and PE by integrating physical activity throughout the curriculum. This approach would include training for non-PE teachers. Also recommended is greater collaboration among classroom and PE teachers. Such approaches are needed to ensure that children have opportunities to be physically active 60 minutes or more a day as per USDHHS physical activity guidelines (2008)/NASPE (2004).

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