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# Best-Practice Guidelines for Physical Activity at Child Care

## abstract

Research has indicated that the child care center is a very strong predictor of preschool-aged children's physical activity levels, making this an important setting to help young children obtain physical activity that is appropriate for their health and development. However, some evidence suggests that organized child care may not adequately support children's physical activity needs. Although many organizations provide recommendations, guidelines, or standards for motor skill development and physical activity opportunities, no set of guidelines exist that directly target the overall physical activity environment at child care. Because of the lack of comprehensive recommendations, the Nutrition and Physical Activity Self-assessment for Child Care best-practice guidelines for healthy weight development were created on the basis of an extensive review of existing guidelines, research evidence, and expert review. The purpose of this article is to present these physical activity best-practice guidelines and provide data on how these guidelines compare to current practice in a large sample ( $N = 96$ ) of child care centers in North Carolina. These best-practice guidelines include recommendations for 8 unique components of the child care environment, including active opportunities, fixed play environment, portable play environment, sedentary opportunities, sedentary environment, staff behavior, staff training/education, and physical activity policies. Our results showed that only a few of the best-practice guidelines were achieved by a majority of the 96 North Carolina child care centers that participated in this study. Establishing comprehensive guidelines for physical activity at child care could result in higher activity levels and healthier children, but more research is needed. *Pediatrics* 2009;124:1650–1659

The rapidly increasing prevalence of childhood obesity is of great public health concern.<sup>1</sup> Nationwide data show that the percentage of obese children (BMI  $\geq$  95th percentile) aged 2 to 5 years increased more than 30% between 2001 and 2004.<sup>2</sup> As is well known, obesity can lead to such chronic health problems as type 2 diabetes, hypertension, and hyperlipidemia. These conditions may be even more serious if obesity develops at younger ages<sup>3</sup>; however, regular physical activity seems to help protect against obesity during the preschool-age period.<sup>4</sup> In addition, physical activity contributes to a child's motor development and provides a foundation for health benefits both during childhood and into the future.<sup>5–7</sup>

One of the best opportunities to promote the development of physically active lifestyles among a large number of young children lies in child care settings.<sup>8,9</sup> In the United States, more than half of all 3- to 6-year-

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### KEY WORDS

child care, physical activity, environment, guidelines

### ABBREVIATIONS

NASPE—National Association for Sport and Physical Education  
NAPSACC—Nutrition and Physical Activity Self-assessment for Child Care

EPAO—Environmental and Policy Assessment and Observation

EGERS—Early Childhood Environment Rating Scale

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olds are enrolled in center-based child care, and those who attend such centers spend an average of 24.8 hours there per week.<sup>10</sup> In North Carolina alone, there are 5052 child care centers with 248 607 children enrolled, and the majority of the children are between the ages of 2 and 5 years.<sup>11</sup>

The importance of the child care setting in helping young children obtain physical activity levels that are appropriate for health and development is reinforced by recent research that indicated that the child care center is a very strong predictor of preschoolers' physical activity levels.<sup>12</sup> However, other evidence has suggested that organized child care may not adequately support children's physical activity needs. For example, Sturm<sup>13</sup> noted an inverse relationship between time spent in child care and time spent engaged in active play. In addition, research by Pate et al<sup>14</sup> showed that children spend more than 80% of their time in sedentary activities while at child care, and only 2% to 3% of their physical activity could be classified as moderate or vigorous.

In 2002, the National Association for Sport and Physical Education (NASPE) put forth the first physical activity guidelines specifically for preschool-aged children.<sup>6</sup> They recommended that children accumulate at least 60 minutes of unstructured (free-play) and at least 60 minutes of structured (adult-led) activities daily. Although the NASPE described the type and amount of activity children should receive, their recommendations provided no specific guidance for the child care setting. Other organizations have provided some recommendations for supporting physical activity opportunities at child care but often lacked specificity and failed to consider the comprehensive array of environmental factors that influence children's physical activity (a full listing of existing na-

tional recommendations for physical activity in preschool-aged children is available on request from the corresponding author).

The purpose of this article is to present a set of physical activity best-practice guidelines and data to show how these guidelines compare to current practice in a large sample of child care centers in North Carolina. Results from this comparison are used to identify areas that could benefit from articulated guidelines.

## METHODS

### Development of Best-Practice Guidelines

The Nutrition and Physical Activity Self-assessment for Child Care (NAPSACC) was developed to promote healthy weight in young children in child care settings. It was designed to address environments, policies, and practices thought to influence nutrition and physical activity behaviors of children. Because of the lack of comprehensive recommendations specific to the child care setting, the NAPSACC best-practice guidelines for healthy weight development were created. Although our best-practice guidelines were based on a careful search of physical activity recommendations and standards from a number of authoritative organizations,<sup>15</sup> no single organization provided adequate guidance. In addition, most existing recommendations and standards failed to provide specific guidance. Where only general or no recommendations existed, a best-practice guideline was developed by using research evidence and expert opinion from a national panel of physical activity researchers and a group of North Carolina public health and child care professionals.<sup>15</sup> The NAPSACC guidelines for physical activity and a list of the national organization source documents from which these best practices were drawn are shown in Table 1.

## Procedures

The NAPSACC program uses a center-based self-assessment instrument based on the NAPSACC guidelines to help child care providers identify and plan nutrition and physical activity changes appropriate for their facility.<sup>15</sup> As part of the evaluation of the NAPSACC, baseline assessments of centers' physical activity and nutrition environments were conducted in the fall of 2005 by research staff; data from the physical activity component are presented in this article. All study procedures and activities were approved by the University of North Carolina's Institutional Review Board.

## Sample

A convenience sample of 96 child care centers from 33 counties across North Carolina was recruited to participate in this study. These child care centers represented all 3 regions of North Carolina (western, eastern, and central Piedmont). Most ( $n = 84$ ) were part of an evaluation of the NAPSACC intervention,<sup>16</sup> but data from 12 additional centers were collected as part of an exploratory study to test the usefulness of the self-assessment instrument alone. Details about center recruitment can be found elsewhere.<sup>16</sup>

## Assessment of the Physical Activity Environment

The centers' physical activity environments were assessed by using the Environmental and Policy Assessment and Observation (EPAO) instrument,<sup>17</sup> which was designed to evaluate child care physical activity policies, practices, and environments specifically for the NAPSACC program. Before the baseline observation, all research staff participated in a training that included a detailed review of the EPAO components, mock observations, and a practice observation in which trainees were compared with our

**TABLE 1** NAPSACC Best-Practice Recommendations

Characteristic	NAPSACC Best Practice
Active opportunities <sup>6,9,23–26,39,40</sup> : daily opportunities that may result in more physical activity	Children provided with at least 120 min of active playtime each day Teacher-led physical activity provided to children $\geq 2$ times per day Outdoor active playtime provided $\geq 2$ times per day
Fixed play environment <sup>9,25,26,39,40</sup> : equipment that is anchored or fixed within the center's outdoor environment	Outdoor play space includes open, grassy areas and a track/path for wheeled toys Indoor play space available for all activities, including running Wide variety of fixed play equipment provided to accommodate the needs of all children
Portable play environment <sup>25,26,39,40</sup> : presence of several types of play equipment that can be transported and used in various locations	Large variety of portable play equipment available for children to use at the same time Outdoor portable play equipment freely available to all children at all times
Sedentary opportunities <sup>6,23–25,27,28,40</sup> : daily opportunities that may result in little or no physical activity	Television or videos rarely or never shown Children are not seated for periods of $>30$ min
Sedentary environment <sup>a</sup> : items in the physical environment that may promote or discourage physical activity	Visible support for physical activity provided in classrooms and common areas through use of posters, pictures, and displayed books Prominent display of sedentary equipment should be limited (eg, televisions, videos, and electronic games)
Staff behavior <sup>6,23,25,26,39,40</sup> : interactions between staff and children that may promote or discourage physical activity	Staff should join children in active play Staff should encourage children to be active Active playtime should never be withheld as punishment, and additional active playtime should be given as a reward
Physical activity training/education <sup>6,9,23,25,26,39,40</sup> : training and education for children, staff, and/or parents that may increase participation or knowledge related to physical activity	Physical activity education is provided to children by using a standardized curriculum at least $\geq 1$ time per week Physical activity education opportunities should be offered to parents $\geq 2$ times per year
Physical activity policies <sup>23–25,39</sup> : child care center has written policies that address facilitation of physical activity	Physical activity training (not including playground safety) should be provided for staff $\geq 2$ times per year Written policies on physical activity should be available and followed

<sup>a</sup> No national recommendations were found for this area.

gold-standard observer. To prevent observer drift, all staff periodically underwent retraining on the EPAO protocol.<sup>17</sup>

The full-day EPAO observation was scheduled at the center's convenience and took place in a classroom for 3-, 4-, or 5-year-olds that was chosen by the center director. Children and center staff were observed, beginning with

the first morning meal and continuing until the last child in the observed classroom left for the day. In addition, center documents were reviewed for evidence of physical activity training of staff, systematic physical activity education of children, and efforts to communicate physical activity information to parents and documentation of written physical activity policies. In this

direct observation and document review, 8 specific environmental characteristics were assessed: active opportunities (3 items); fixed and portable play environment (7 items); sedentary opportunities (3 items); sedentary environment (3 items); staff behavior (3 items); physical activity training and education (4 items); and physical activity policies (5 items). Items from the EPAO instrument parallel the NAPSACC best-practice guidelines and describe the degree to which centers achieve this standard. Reliability and validity evidence for the instrument demonstrate strong agreement between observers within centers (intra-correlation coefficient: 0.47–1.00).<sup>17</sup> Although the EPAO instrument does not measure child physical activity directly, previous research has shown that children at centers with higher EPAO scores (above median) get more moderate or vigorous physical activity and less sedentary activity compared with children at centers with lower EPAO scores.<sup>18</sup> A copy of the EPAO is available on request from the corresponding author.

## RESULTS

### Center Demographics

Using the North Carolina 1- to 5-star rating system,<sup>19</sup> with 5 stars being the highest, ~50% were 3-star centers, whereas 5% held 1-star ratings and 11% had 5-star ratings. Ninety-three percent of the centers were open until at least 4:30 PM, allowing for a full day of care; only 7% closed at or before 3:30 PM. Median center enrollment was 66 children, and nearly half of those enrolled were 3- to 5-year-olds. More than 75% of the centers participated in the Child and Adult Care Food Program.<sup>20</sup> The race/ethnicity distribution of the children who were attending these centers was similar to the demographics of North Carolina's population: 60% white, 28% black, 4.2% Native American, and 3.6% Hispanic/

Latino. On average, centers had been in operation for 17 years. Data from these centers and how well they met the best-practice guidelines are described below and summarized in Table 2.

### Meeting Best-Practices Guidelines

#### Active Opportunities

The active opportunities guideline addresses total activity time, teacher-led activities, and time spent outside by children at a center. Although only 13.7% of the centers met the NAPSACC best-practice guideline of 120 minutes of active playtime per day, nearly one third of them provided more than 90 minutes of activity on the day of observation. However, 6 centers provided only 15 minutes of activity time. Teacher-led activity was observed in 70% of the centers, but the amount of structured activity time ranged from <15 minutes in 36% of the centers to more than 60 minutes in 1 center. As for meeting the best-practice guideline, 40% of the centers provided 2 or more occasions of teacher-led physical activity. A large proportion (88%) of centers included outdoor play on the day of observation, and children at more than half of the centers went outside 2 or more times. In this assessment, specific amounts of outside time provided for the children were not recorded.

#### Fixed Play Environment

This best-practice guideline refers to fixed or anchored equipment, open and grassy outdoor spaces that include paths for wheeled toys, and indoor space appropriate for gross motor movement. Nearly all the centers (96%) had sandboxes, tunnels, and slides, and almost as many (95%) had large climbing structures. However, only 16% of the centers had indoor play space suitable for a variety of gross motor activities (eg, running and large group games).

**TABLE 2** Meeting NAPSACC Best-Practice Recommendations on the Basis of the EPAO Instrument

Variable	No. (%) of Centers
<b>Active opportunities</b>	
Total active play, min	
0–14	6 (6.3)
15–30	10 (10.5)
31–45	10 (10.5)
46–60	13 (13.7)
61–90	24 (25.3)
91–120	19 (20.0)
>120	13 (13.7)
Missing	1
Total structured physical activity, min	
0	29 (30.5)
1–14	34 (35.8)
15–30	23 (24.2)
31–45	7 (7.4)
46–60	1 (1.0)
>60	1 (1.0)
Missing	1
Occasions of structured activity, <i>n</i>	
0	29 (30.2)
1	29 (30.2)
2	20 (20.8)
3	15 (15.6)
≥4	3 (3.1)
Outdoor play occasions, <i>n</i>	
0	11 (11.7)
1	33 (35.1)
2	46 (48.9)
≥3	4 (4.3)
Missing	2
<b>Fixed play environment</b>	
Fixed equipment	
Climbing structures	92 (95.8)
Balancing surfaces	79 (82.3)
Swinging equipment	39 (40.6)
Running spaces (open space to run and play)	96 (100)
Miscellaneous play structures (sand boxes, slides, etc)	92 (95.8)
Space present	
Indoor play space allows for	
Quiet play only	5 (5.2)
Limited movement	54 (56.3)
Some active play	22 (22.9)
All activities	15 (15.6)
Portable play environment: portable play equipment	
Floor play equipment (tumbling mats, carpet squares, etc)	52 (54.2)
Jumping play equipment (hula hoops, jump ropes)	33 (34.4)
Twirling play equipment (scarves, batons, ribbons)	30 (31.6)
Miscellaneous portable play equipment available (shovels, buckets, trucks, balls, tricycles, etc)	64 (66.7)
<b>Sedentary opportunities</b>	
Children seated for >30 min, <i>n</i>	
0	77 (81.9)
1	12 (12.8)
2	5 (5.3)
≥3	0
Missing	2
Television-viewing time (in classrooms with television present), min	
0	5 (11.9)
1–14	4 (9.5)
15–30	8 (19.1)
31–45	9 (21.4)
46–60	7 (16.7)
>60	9 (21.4)

**TABLE 2** Continued

Variable	No. (%) of Centers
Sedentary environment: equipment present in classroom observed	
Television	42 (43.8)
Computer	53 (55.2)
Posters, books, or displays supporting physical activity	38 (39.6)
Staff behaviors	
Separate times staff joined in active play, <i>n</i>	
0	28 (29.5)
1–2	30 (31.6)
3–4	23 (24.2)
5–6	5 (5.3)
≥7	9 (9.5)
Missing	1
Separate times staff provided verbal prompts to increase physical activity, <i>n</i>	
0	27 (28.4)
1	20 (21.1)
2	16 (16.8)
3	11 (11.6)
≥4	21 (22.1)
Missing	1
Separate times staff restricted active play as punishment, <i>n</i>	
0	56 (58.3)
1	21 (21.9)
2	6 (6.3)
3	8 (8.3)
4	5 (5.2)
Separate times staff increased active play as a reward, <i>n</i>	
0	91 (97.8)
1	1 (1.1)
3	1 (1.1)
Missing	3
Physical activity training/education	
Physical activity training materials existed	
Yes	24 (25.5)
No	70 (74.5)
No opportunity to observe	
	2
Evidence of a written physical activity curriculum was present	
Yes	17 (18.1)
No	77 (81.9)
No opportunity to observe	
	2
Physical activity education opportunities are offered to parents, workshops and activities reviewed	
Yes	4 (4.3)
No	90 (95.7)
No opportunity to observe	
	2
Physical activity policy: written policy on physical activity	
Yes	53 (56.4)
No	41 (43.6)
No opportunity to observe	
	1

### Portable Play Environment

This best-practice guideline refers to the availability and accessibility of play equipment that can be transported and used in various locations (eg, jump ropes, hula hoops, tumbling mats, batons, balls). Portable equip-

ment was present at all 96 centers; however, the variety and amount varied. Floor equipment, such as tumbling mats, was available in nearly half the centers, whereas only one third of the centers provided jumping and twirling equipment. Balls and other miscella-

neous equipment items were available in approximately two thirds of the centers.

### Sedentary Opportunities and Sedentary Environment

These 2 guidelines address sedentary time and the sedentary environment within which children spend their time. Of the 96 centers that participated in the study, children were rarely seated for more than 30 minutes at a time; only 18% of the centers failed to meet this best-practice guideline. In 5 of those centers, children were seated for more than 30 minutes on 2 separate occasions. Television-viewing is a popular sedentary opportunity, and although television was present in less than half (44%) of the observed classrooms, television-viewing was observed in nearly all (89%) of these centers. On the day of observation, 17% of the centers allowed children to watch between 31 and 60 minutes of television, and 9% of the centers allowed children to watch more than 60 minutes of television. On a more positive note, nearly 40% of the centers displayed some physical activity promotional material in the observed classrooms.

### Staff Behavior

Staff behavior at child care centers can be influential in the amount of physical activity that children receive during the day. This best-practice guideline addresses the number of times staff members joined in active play, used verbal prompts to increase activity, and restricted physical activity as punishment. At 61% of the centers, the staff members either failed to join in active play with children or did so only 1 or 2 times during the full-day observation. However, in some centers (15%), center staff participated 5 or more times. Staff in 40% of the centers used verbal prompts 3 or more times, whereas 1 or no prompts were observed in 49% of the centers. Center

staff were observed restricting active play as punishment at 40% of centers visited, whereas increasing active play as a reward was observed at only 2 centers.

#### *Physical Activity Training/Education*

This best-practice guideline refers to staff training, the use of a specific physical activity curriculum, and provision of physical activity education to parents. Documents reviewed included completed physical activity training certificates and available training materials. At 25% of the centers, documentation showed that at least 1 staff member had obtained some sort of training in physical activity. Only 18% of the centers provided visual evidence of a formal physical activity curriculum; however, use of the curriculum was not evaluated in this study. Only 4% of the centers documented that they provided physical activity education for parents (eg, workshops or other specific activities).

#### *Physical Activity Policies*

This best-practice guideline supports the use of written policies associated with physical activity. Fewer than 60% of the centers had evidence of formal, written physical activity policies. Of those with written policies, nearly all had a policy about either active play or inactive time; 48% included a statement about active play, and 56% had a policy about inactive time. However, the majority of these “policies” included such vague statements as “go outside daily, weather permitting.” The policies did not include specific details about the amount of outdoor or indoor active playtime to be provided. Among the written policies that did exist, there were other references related to television use and television-viewing (3%), the play environment (8%), supporting physical activity (6%), and physical activity education (1%).

## DISCUSSION

Physicians, public health leaders, and national organizations recognize the potential influence that child care environments have on young children’s diet and activity behaviors and, hence, their weight development.<sup>21–23</sup> Providing opportunities for and promoting participation in physical activity are prime examples of how child care providers can contribute to children’s energy balance. Although a number of organizations (eg, the American Academy Pediatrics,<sup>24–26</sup> National Association of the Education of Young Children,<sup>27,28</sup> Head Start,<sup>29</sup> and NASPE<sup>6</sup>) have addressed aspects of physical activity for young children, most documents have provided only general guidance. NASPE guidelines do provide specific recommendations for the amount of active playtime (both free and structured) that preschool-aged children should obtain each day; however, these recommendations are not specific to the child care setting.

In this article, we describe the first effort to integrate existing recommendations from authoritative organizations, evidence from the research literature, and feedback from expert panels into a set of comprehensive best practices for physical activity at child care centers. The NAPSACC best-practice guidelines include recommendations for 8 separate components of the child care environment and were designed to promote physical activity levels of young children. Although research evidence is limited, results of cross-sectional studies have suggested that environmental characteristics of the child care setting are associated with the young child’s physical activity.<sup>18,30,31</sup>

The active-opportunities guideline suggests specific time for free play (120 minutes). Although some studies have shown that provision of active playtime is associated with child physical activity,<sup>18,30</sup> the optimal amount of time

that should be provided is unclear. Currently, the only national recommendation for the amount of physical activity that preschool-aged children should receive daily is the NASPE 120-minute recommendation<sup>6</sup> (free play and structured activity time combined), which is not specific for the child care setting. At the time of this publication, only 3 states had specific time requirements for physical activity at child care, and these ranged between 20 and 60 minutes/day.<sup>32,33</sup> However, in this study we observed that 57% of the centers already offered more than 60 minutes of active playtime, most of which was designated as free play. On the basis of available recommendations and other information, we felt that 120 minutes of active playtime across a full day would give children generous opportunities to develop their motor skills, expend energy, improve fitness, and develop important social/behavioral skills and still be within a center’s ability to provide this amount of time in its schedule.

In addition, the active opportunities guideline also includes the provision of structured physical activity (2 per day) and occasions of outdoor playtime (2 per day). Structured physical activity helps children develop basic motor skills that are the building blocks needed for future participation in sports and fitness activities.<sup>5–7,34</sup> Also, time outdoors has consistently been found to be a strong predictor of physical activity levels of young children.<sup>34–37</sup> The active opportunities guideline specifies that child care settings provide 2 or more occasions of both structured physical activity and outdoor play. Specifying the number of occasions, as opposed to a specific amount of time, is a new approach, one that offers flexibility for centers in how they provide these experiences. By comparison, NASPE recommendations

specify 60 minutes of structured physical activity daily.<sup>6</sup> We felt that requiring 60 minutes of structured physical activity every day might limit children's access to important free playtime<sup>39</sup> and be difficult for centers to provide because of the limited background and training of providers in children's physical activity. Occasions of physical activity could be provided through less formal teaching opportunities (eg, using music for spontaneous dancing or adding motor skills to interactive story time). These occasions could be easier for teachers to initiate throughout the day; however, research is needed to determine if these short occasions are beneficial to the development of preschool-aged children's gross motor skills.

Although some literature (eg, *Caring for Our Children*,<sup>39</sup> Early Childhood Environment Rating Scale [ECERS],<sup>40</sup> Head Start<sup>29</sup>) recommends time outside, NASPE guidelines do not mention time outdoors.<sup>6</sup> We feel that, along with total activity time, specifying multiple occasions of outdoor playtime is important. It has been observed that children are most active during the first 10 minutes of active play periods.<sup>34</sup> In fact, authors of a recent study of Latino children at a Head Start center found that adding 30 minutes to an existing 30-minute outdoor play period for morning and afternoon time on 2 separate days did not increase accelerometer-measured physical activity.<sup>41</sup> Thus, having multiple outdoor sessions may produce more physical activity than single, longer sessions.

The fixed- and portable-play-environment guidelines specify that child care settings should have an indoor play space available for a variety of gross motor activities and an outdoor play space that includes open, grassy areas, a track/path for wheeled toys, and a large variety of fixed equipment. In addition, portable play equipment for use inside and outside should be pro-

vided. Indoor active play areas are limited at child care settings but may be an important provision for physical activity in certain geographical regions with climate extremes. Research has shown that when children have a large and open play space, they modify their behavior to include more physical activities such as tag and other games that require running and chasing.<sup>42</sup> Quality outdoor environments may afford children greater amounts of physical activity and provide a stimulating learning environment; however, this research area is in its infancy.<sup>43</sup> Play equipment has also been shown to prompt children's participation in more physically challenging activities; conversely, its absence is associated with more sedentary and inactive games.<sup>42</sup> Bower et al<sup>18</sup> found that most centers had fixed play equipment (eg, large climbing structures) but a minimal variety and quantity of portable equipment (eg, balls, hoops, ropes). However, it was not fixed equipment but portable equipment that was found to be associated with greater amounts of physical activity, which has been confirmed in other studies.<sup>18,31</sup> It is difficult, however, to quantify the optimal amount of either fixed or portable equipment necessary to affect children's activity levels. Although these best-practice guidelines offer some guidance to child care professionals, more research in this area is needed. Another critical component to promoting energy balance in children is limiting time spent in sedentary activities (sedentary opportunities). Recent observational studies have shown that children spend the majority of their time at child care being sedentary.<sup>14,18,30,44–48</sup> Brown et al<sup>49</sup> recently reported that a large sample ( $n = 539$ ) of children spent 89% of their time in sedentary pursuits, 8% in light activity, and only 3% of their time in moderate or greater physical activity. There-

fore, our best practices include a sedentary opportunities guideline that specifies avoiding continuous sitting for more than 30 minutes. This best-practice guideline also recommends that television/video be rarely or never used, which is consistent with many other recommendations (eg, ECERS, National Association of the Education of Young Children), although the American Academy Pediatrics recommends less than 2 hours of television/video use across the total day (including time at home). Because television-viewing has consistently been associated with risk for overweight,<sup>50</sup> we feel that this guideline is appropriate. Although sedentary opportunities and sedentary environment were initially represented as two discrete best-practice guidelines, future versions should integrate these two into a single guideline called "sedentary opportunities."

The staff-behavior best-practice guideline advises center staff members to encourage children to be active, to join children in active play, and, rather than withhold active playtime from children who misbehave, to reward good behavior with extra playtime. Although we observed some verbal prompting and activity modeling, restriction of activity was widespread (observed in >58% of the centers). This guideline may be necessary to clearly establish the important role that staff members play in the promotion of physical activity for children at child care settings.

The best-practices guideline for staffing training/education includes a component directed toward children, staff, and parents. Included in this guideline is the provision of teacher-led lessons that use standard curriculum materials available for use with preschool-aged children (eg, *Color Me Healthy*,<sup>51</sup> *SPARK*,<sup>52</sup> *Animal Trackers*<sup>53</sup>). In future versions of our best-practices docu-

ment, this component will be integrated into the active opportunities guidelines, and a component will be added to the staff-behaviors guideline that encourages informal teacher-led activity sessions (eg, dancing to music or outdoor games such as relay races). In addition to addressing formal child education, the education/training guideline treats staff training as an equally important component. When child care staff lack knowledge of existing recommendations for physical activity, fail to comprehend their role in affecting child activity, or have no familiarity with activity resources, some studies have revealed that lower levels of physical activity occur.<sup>18,30</sup> Lack of training may explain the failure of staff to be actively involved in the children's physical activity and the inappropriate staff behaviors that we observed. Research has shown a positive association between increased education and experience of teachers and time that children spend on physical activity<sup>30,31,54</sup> and motor skill development.<sup>54</sup> The ECERS-R instrument, one of the most widely used rating scales of child care quality, encourages staff to assist children with needed skill development by using appropriate equipment and providing creative ideas to enhance play.<sup>40</sup> Along with providing structured physical activity, adult supervision could encourage children during play and stimulate their participation (and time spent) in fundamental movement

skills, including manipulative skills such as catching and throwing.<sup>55</sup>

Finally, few centers had written, comprehensive policy documents that addressed important components of the child care environment. Most of the policies that did exist related to time that the children would spend outside. Only a couple of the centers were concerned with staff behavior, staff training, or specific time for physical activity. Adoption of specific, written physical activity policies should contribute to more children being active during their child care day.

### CONCLUSIONS

Although the NAPSACC best-practice guidelines may need additional modification, they represent the first effort to create a single set of comprehensive guidelines for physical activity for child care centers. Originally designed as part of a healthy weight intervention,<sup>15</sup> these guidelines are based on a review of existing recommendations from authoritative groups, additional research evidence, and advice from a panel of experts. Currently, no state has a set of existing policies and/or standards comparable in detail and/or breadth to the NAPSACC best practices as evidenced by 2 review articles.<sup>32,33</sup> Therefore, it is not surprising that only a few of the best-practice guidelines were adhered to by a majority of the 96 North Carolina child care centers that participated in this study. Recent research showed that child-initiated

play is being eliminated from kindergarten classrooms and viewed as unimportant compared with more academic learning.<sup>56</sup> Because the preschool setting prepares children for kindergarten, child-initiated play and active playtime could be at risk of elimination.<sup>56</sup> Policy makers and child care providers would undoubtedly benefit from more specific physical activity recommendations and standards, and the NAPSACC best-practice guidelines provides a useful start toward this discussion. In addition, future research should address components of these guidelines relative to their importance and potential for promoting healthy weight development in preschool-aged children in the child care setting.

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### REFERENCES

1. Ludwig DS. Childhood obesity: the shape of things to come. *N Engl J Med*. 2007;357(23):2325–2327
2. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA*. 2006;295(13):1549–1555
3. Must A, Strauss RS. Risks and consequences of childhood and adolescent obesity. *Int J Obes Relat Metab Disord*. 1999;23(suppl 2):S2–S11
4. Reilly JJ. Physical activity, sedentary behaviour and energy balance in the preschool child: opportunities for early obesity prevention. *Proc Nutr Soc*. 2008;67(3):317–325
5. Haywood KM, Getchell N. *Lifespan Motor Development*. 3rd ed. Champaign, IL: Human Kinetics; 2001
6. National Association for Sport and Physical Education. *Active Start: A Statement of Physical Activity Guidelines for Children Birth to Five Years*. Reston, VA: NASPE Publications; 2002
7. Gabbard CP. *Lifelong Motor Development*. 3rd ed. Madison Dubuque, IA: Brown and Benchmark; 2000
8. Federal Interagency Forum on Child and Family Statistics. *America's Children in Brief: Key National Indicators of Well-being, 2006*. Washington, DC: US Government Printing Office; 2006
9. Patrick K, Spear B, Holt K, Sofka D, eds.

*Bright Futures in Practice: Physical Activity*. Arlington, VA: National Center for Education in Maternal and Child Health; 2001

10. Iruka IU, Carver PR. *Initial Results From the 2005 NEHS Early Childhood Program Participation Survey*. US Department of Education; 2006. NCES 2006075
11. North Carolina Division of Child Development. Division of Child Development monthly statistical summary. Available at: [http://ncchildcare.dhhs.state.nc.us/general/Child\\_Care\\_Statistical\\_Report.asp](http://ncchildcare.dhhs.state.nc.us/general/Child_Care_Statistical_Report.asp). Accessed April 2, 2009
12. Finn K, Johannsen N, Specker B. Factors associated with physical activity in preschool children. *J Pediatr*. 2002;140(1):81–85
13. Sturm R. Childhood obesity: what we can learn from existing data on societal trends, part 1. *Prev Chronic Dis*. 2005;2(1):A12
14. Pate RR, McIver K, Dowda M, Brown WH, Addy C. Directly observed physical activity levels in preschool children. *J Sch Health*. 2008;78(8):438–444
15. Ammerman AS, Ward DS, Benjamin SE, et al. An intervention to promote healthy weight: Nutrition and Physical Activity Self-assessment for Child Care (NAP SACC) theory and design. *Prev Chronic Dis*. 2007;4(3):A67
16. Ward DS, Benjamin SE, Ammerman AS, Ball SC, Neelon BH, Bangdiwala SI. Nutrition and physical activity in child care: results from an environmental intervention. *Am J Prev Med*. 2008;35(4):352–356
17. Ward D, Hales D, Haverly K, et al. An instrument to assess the obesogenic environment of child care centers. *Am J Health Behav*. 2008;32(4):380–386
18. Bower JK, Hales DP, Tate DF, Rubin DA, Benjamin SE, Ward DS. The childcare environment and children's physical activity. *Am J Prev Med*. 2008;34(1):23–29
19. North Carolina Division of Child Development. Rated license for child care centers with preschool and school age classrooms. Available at: [http://ncchildcare.dhhs.state.nc.us/general/mb\\_revisedratedlicense.asp](http://ncchildcare.dhhs.state.nc.us/general/mb_revisedratedlicense.asp). Accessed June 6, 2007
20. US Department of Agriculture, Food and Nutrition Service. Child & adult care food program. Available at: [www.fns.usda.gov/cnd/care/cacfp/cacfphome.htm](http://www.fns.usda.gov/cnd/care/cacfp/cacfphome.htm). Accessed October 13, 2009
21. Story M, Kaphingst KM, French S. The role of child care settings in obesity prevention. *Future Child*. 2006;16(1):143–168
22. Vásquez F, Salazar G, Andrade M, Vásquez L, Díaz E. Energy balance and physical activity in obese children attending day-care centers. *Eur J Clin Nutr*. 2006;60(9):1115–1121
23. Maher EJ, Li G, Carter L, Johnson DB. Preschool child care participation and obesity at the start of kindergarten. *Pediatrics*. 2008;122(2):322–330
24. American Academy of Pediatrics, Committee on Public Education. Children, adolescents, and television. *Pediatrics*. 2001;107(2):423–426
25. American Academy of Pediatrics, Committee on Nutrition. Prevention of pediatric overweight and obesity. *Pediatrics*. 2003;112(2):424–430
26. American Academy of Pediatrics, Committee on Sports Medicine and Fitness. Fitness, activity, and sports participation in the preschool child. *Pediatrics*. 1992;90(6):1002–1004
27. National Association for the Education of Young Children. *Accreditation Criteria & Procedures of the National Association for the Education of Young Children*. Washington, DC: National Association for the Education of Young Children; 1998
28. National Association for the Education of Young Children. *Technology and Young Children: Ages 3 Through 8*. Washington, DC: National Association for the Education of Young Children; 1996
29. US Department of Health and Human Services, Administration for Children and Families, Head Start Bureau. Office of Head Start: legislation & regulations. Available at: [www.acf.hhs.gov/programs/ohs/legislation/index.html](http://www.acf.hhs.gov/programs/ohs/legislation/index.html). Accessed August 21, 2008
30. Dowda M, Pate RR, Trost SG, Almeida MJ, Sirard JR. Influences of preschool policies and practices on children's physical activity. *J Community Health*. 2004;29(3):183–196
31. Dowda M, Brown WH, McIver KL, et al. Policies and characteristics of the preschool environment and physical activity of young children. *Pediatrics*. 2009;123(2). Available at: [www.pediatrics.org/cgi/content/full/123/2/e261](http://www.pediatrics.org/cgi/content/full/123/2/e261)
32. Benjamin SE, Craddock A, Walker EM, Slining MM, Gillman MW. Obesity prevention in child care: a review of U.S. state regulations. *BMC Public Health*. 2008;8:188
33. Kaphingst KM, Story M. Child care as an untapped setting for obesity prevention: state child care licensing regulations related to nutrition, physical activity, and media use for preschool-aged children in the United States. *Prev Chronic Dis*. 2009;6(1):A11
34. McKenzie TL, Sallis JF, Elder JP, et al. Physical activity levels and prompts in young children at recess: a two-year study of a bi-ethnic sample. *Res Q Exerc Sport*. 1997;68(3):195–202
35. Hinkley T, Crawford D, Salmon J, Okely AD, Hesketh K. Preschool children and physical activity: a review of correlates. *Am J Prev Med*. 2008;34(5):435–441
36. Baranowski T, Thompson WO, DuRant RH, Baranowski J, Puhl J. Observations on physical activity in physical locations: age, gender, ethnicity, and month effects. *Res Q Exerc Sport*. 1993;64(2):127–133
37. Klesges RC, Eck LH, Hanson CL, Haddock CK, Klesges LM. Effects of obesity, social interactions, and physical environment on physical activity in preschoolers. *Health Psychol*. 1990;9(4):435–449
38. Burdette HL, Whitaker RC. Resurrecting free play in young children: looking beyond fitness and fatness to attention, affiliation, and affect. *Arch Pediatr Adolesc Med*. 2005;159(1):46–50
39. American Academy of Pediatrics; American Public Health Association; National Resource Center for Health and Safety in Child Care. *Caring for Our Children: National Health and Safety Performance Standards—Guidelines for Out-of-Home Child Care Programs*. 2nd ed. American Academy of Pediatrics, Elk Grove Village, IL; 2002. Available at: <http://nrckids.org/CFOC/index.html>. Accessed October 6, 2009
40. Harms T, Clifford RM, Cryer D. *Early Childhood Environment Rating Scale*. Revised ed. New York, NY: Teachers College Press; 2005
41. Alhassan S, Sirard JR, Robinson TN. The effects of increasing outdoor play time on physical activity in Latino preschool children. *Int J Pediatr Obes*. 2007;2(3):153–158
42. Dhingra R, Manhas S, Raina A. Play pattern in preschool setting. *J Hum Ecol*. 2005;18(1):21–25
43. DeBord K, Moore R, Hestenes L, Cosco N, McGinnis J. *Preschool Outdoor Environment Measurement Scale (POEMS)*. Lewisville, NC: Kaplan Early Learning Company; 2005
44. Boldemann C, Blennow M, Dal H, et al. Impact of preschool environment upon children's physical activity and sun exposure. *Prev Med*. 2006;42(4):301–308
45. Finn KJ, Specker B. Comparison of Activity Rating Scale in children. *Med Sci Sports Exerc*. 2000;32(10):1794–1797
46. Pate RR, Pfeiffer KA, Trost SG, Ziegler P, Dowda M. Physical activity among children attending preschools. *Pediatrics*. 2004;114(5):1258–1263
47. Trost SG, Sirard JR, Dowda M, Pfeiffer KA, Pate RR. Physical activity in overweight and

- nonoverweight preschool children. *Int J Obes Relat Metab Disord*. 2003;27(7):834–839
48. Trost SG, Fees B, Dziewaltowski D. Feasibility and efficacy of a “move and learn” physical activity curriculum in preschool children. *J Phys Act Health*. 2008;5(1):88–103
  49. Brown WH, Pfeiffer KA, McIver KL, Dowda M, Addy CL, Pate RR. Social and environmental factors associated with preschoolers' non-sedentary physical activity. *Child Dev*. 2009;80(1):45–58
  50. Gortmaker SL, Must A, Sobol AM, Peterson K, Colditz GA, Dietz WH. Television viewing as a cause of increasing obesity among children in the United States, 1986–1990. *Arch Pediatr Adolesc Med*. 1996;150(4):356–362
  51. Dunn C, Thomas C, Pegram L, Ward D, Schmal S. Color me healthy, preschoolers moving and eating healthfully. *J Nutr Educ Behav*. 2004;36(6):327–328
  52. SPARK Early Childhood Physical Activity Program. SPARK early childhood physical activity program. Available at: [www.sparkpe.org/programEarlyChildhood.jsp](http://www.sparkpe.org/programEarlyChildhood.jsp). Accessed October 13, 2009
  53. Williams CL, Carter BJ, Kibbe DL, Dennison D. Increasing physical activity in preschool: a pilot study to evaluate animal trackers. *J Nutr Educ Behav*. 2009;41(1):47–52
  54. Parish LE, Rudisill ME, St Onge PM. Mastery motivational climate: influence on physical play and heart rate in African American toddlers. *Res Q Exerc Sport*. 2007;78(3):171–178
  55. Taggart A, Keegan L. Developing fundamental movement skills in outdoor settings: three case studies of children playing. *ACHPER Healthy Lifestyles J*. 1997;44(4):11–17
  56. Miller E, Almon J. *Crisis in the Kindergarten: Why Children Need to Play in School*. College Park, MD: Alliance for Childhood; 2009

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Noted by JFL, MD

## Best-Practice Guidelines for Physical Activity at Child Care

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