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SUN PROTECTION POLICIES AND PRACTICES AT CHILD CARE CENTERS IN MASSACHUSETTS

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ABSTRACT: We assessed the relationship between sun protection policies and practices at child care centers in Massachusetts. We hypothesized that centers with sun protection policies were more likely to have regular sun protection practices in place compared to centers without these policies. We conducted a telephone survey with directors or assistant directors at 327 child care centers during the summer of 2002. The main outcome measure was sun protection practices, which included time spent outside during mid-day and the use of sunscreen, hats, and protective clothing by the majority of children assessed over the last 5 program days. The 36-item survey also inquired about the center's sun protection policy and included demographic questions. Most centers (73%) reported having a written sun protection policy. Sun protection policies were positively associated with reported sunscreen (χ^2=14.63, p = 0.0001) and hat use (χ^2=30.98, p < 0.0001) and inversely associated with time outside (χ^2=10.76, p = 0.001). Seventy-seven percent of centers followed recommended sunscreen practices. However, centers were far less likely to have recommended hat use (36%) and protective clothing (1.5%) practices. A formal sun protection policy may be an effective way to increase sun protection practices in the child care setting. Further research should assess this relationship in other states. Improving and expanding existing state regulations may be a reasonable strategy to increase sun protection at child care centers.

KEY WORDS: child care; community health; skin cancer control; disease prevention.

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INTRODUCTION

Although skin cancer is largely preventable, it remains the most common cancer in the United States, affecting one in five Americans during their lifetime.[1] Childhood sun exposure significantly increases the risk of melanoma: individuals with one or more severe sunburns during childhood have twice the risk of developing melanoma compared to those with no history of sunburn.[2–5] In addition, a large proportion of total lifetime sun exposure occurs during childhood.[4,6] Therefore, prevention efforts to increase sun awareness and promote sun protection among children are warranted. The national SunWise School Program, developed by the U.S. Environmental Protection Agency, has provided sun protection education to U.S. schools since 2000. Although there are studies reporting on interventions designed to promote sun protection in the child care and preschool setting, there have been no widespread coordinated efforts to address sun protection at earlier ages.[7–10]

Child care centers represent special sites of opportunity for skin cancer prevention. Young children enrolled in child care may spend a significant amount of time at these sites, especially during mid-day when ultraviolet (UV) radiation levels are highest. Child care centers may reduce sun exposure during a critical period of life by using educational and environmental strategies and adopting policies that can encourage the development of lifelong healthy behaviors. Despite compelling arguments for more focused efforts to increase sun protection measures at child care centers, to our knowledge no nationwide program and only one statewide program in California have released policy guidelines and a curriculum designed for this setting.[11]

Massachusetts requires group day care and school age child care programs to comply with two regulations regarding sun protection. One regulation states that sunscreen may be ''administered to children with written parental authorization''[12] and the other states that the outdoor play area should be ''accessible to both direct sunlight and shade.''[12]

Although most decisions regarding sun protection are made by the centers, no information has been obtained on the adequacy and regularity of sun protection practices and associated policies. The Massachusetts Department of Public Health (MDPH), in collaboration with the Office of Child Care Services (OCCS), conducted a telephone survey to study the relationship between reported sun protection policies and practices at child care sites. We hypothesized that centers with sun protection policies were more likely to have regular sun protection practices compared to centers without these policies.

METHODS

During the summer of 2002, a random sample of 655 child care centers was selected from the list of 1968 state-licensed child care centers obtained from OCCS. Eligible centers must have had valid telephone numbers and children of preschool age (between 2.9 and 7 years old, who were not yet enrolled in first grade). From the sample of 655 centers, 148 centers were omitted from the study (116 centers verified as closed for the summer, 24 centers with no preschoolers enrolled, 7 centers without a valid telephone number, and 1 center whose director did not speak English), leaving 507 for inclusion in the study. Surveys were completed by 327 of these centers (65%); of the 180 nonresponders, 168 centers were not reached, 10 centers declined to participate, and 2 centers with multiple sites responded for another center. Of the 168 centers not reached, a random sample of 20 centers was called after the summer of 2002. Seventy-five percent of these centers reported not being open during the summer months, while 25% reported that they were open during the summer. Review of study implementation identified transcription errors in the random selection procedure accounting for 3% of incorrect centers being included in the sample of 655.

The telephone survey was conducted during July and August of 2002. Child care directors or assistant directors completed the survey. All three interviewers identified themselves as being affiliated with MDPH. Each center was called a maximum of 3 times.

A 36-item telephone survey was developed using some items that had been used previously. New questions were examined by experts in the sun protection field and evaluated by child care professionals. We assessed (1) use of the outdoor play area by time of day and amount of shade in that area, (2) sun protection practices at the center, such as time spent outside during mid-day (defined as the time between 10:00 a.m. and 2:00 p.m.), frequency of use (i.e. always, usually, sometimes, rarely, never) of sunscreen, hats, and protective clothing (e.g., long sleeves or long pants outside) over the last five program days, and time of sunscreen application, (3) whether centers had a ''written policy regarding sun protection'' (beyond the written sunscreen permission form) and the components of that policy, and (4) whether proposed strategies to increase sun protection practices may be useful within the child care setting. Other survey questions addressed center characteristics that may influence sun protection practices and policies, such as the number of preschoolers enrolled, percent of children who were non-Hispanic White, percent of parents denying permission for sunscreen application by the center, and the extent of the

respondents' personal concern about getting skin cancer. We created a sun protection policy scale (range 0–6) to account for the number of policy components (0–6 components) in the policy, and a sun protection practices index (range 0–20), a score reflecting use of sunscreen, hats, and protective clothing as well as time spent outside during mid-day, measured on 5-point scales (5 points times 4 components equals a maximum of 20 points).

The primary outcome measure was sun protection practices. Use of sunscreen, hats, and protective clothing, such as long sleeves or long pants, by the majority of children was assessed over the last 5 program days and categorized as either consistent with or not consistent with recommended practices, based on the Centers for Disease Control and Prevention and American Cancer Society guidelines.[13,14] Sunscreen use consistent with recommended practices was defined as the majority of children always wearing sunscreen when outside, while hat use and use of protective clothing was defined as the majority of children always or usually wearing a hat or protective clothing when outside, respectively. We used slightly different criteria for sun protection practices other than sunscreen since they were less commonly practiced.

We assessed the associations between specific sun protection policy components and practices, and examined potential confounders that might explain these associations, including amount of shade in the outdoor play area, number of preschoolers, race/ethnicity, and socio-economic status. We evaluated potential confounders by examining the associations between the confounder and the exposure and outcome variables, and identified confounders at an alpha level of 0.05. Sample size precluded the ability to assess effect modification by these variables.

We compared the average median household incomes by city in the 327 participating centers, the 148 centers omitted from the study, and the 180 non-participating centers, using 2000 Census data. Income data were categorized into tertiles defined as low socioeconomic status (SES) (≤$45,240), intermediate SES ($45,241–61,000), and high SES (>$61,000). Spearman rank-correlation coefficients were used to assess the relationship between two variables, as many variables were ordinal. A chi-square test was used to test relationships between two dichotomous variables. Statistical analyses were performed using SAS.

We examined possible associations between center size, percent of non-Hispanic White children (using highest and lowest quartiles), and SES and the following variables: time spent outside during mid-day, sunscreen and hat practices, existence of a sun protection policy, and components of that policy. In addition, we evaluated the possible associations between daily

use of sunscreen and time spent outside and director/assistant director's concern about skin cancer and existence of a sun protection policy.

This study was exempt from institutional review board approval because no personal identifiers were involved. Informed consent was obtained by telephone from all participants who were interviewed.

RESULTS

The characteristics of participating centers are listed in Table 1. An average of 51 preschoolers attended each center (SD 83, Range 5–1200). The average proportion of non-Hispanic White children was 72% (SD 32%), with 61% of centers having ≥75% Non-Hispanic White children, and 14% of centers with ≤25% Non-Hispanic White children. Average median household income for the towns and cities of the 327 participating centers, the 148 centers omitted from the study, and the 180 non-participating centers was $53,984, $62,120, and $58,655, respectively.

Seventy-seven percent of centers stated that the majority of children always wore sunscreen when outside, assessed over the last five program days. Only 4% of centers reported that the majority of preschoolers never or rarely wore sunscreen when outside. Despite most centers having a daily practice of applying sunscreen, 24% of these centers do not wait at least 20–30 minutes before going outside after sunscreen application. Fewer centers complied with recommendations for hat use and other forms of protective clothing. Thirty-six percent of centers reported hat use consistent with recommended practices, while 21% reported that the majority of preschoolers never or rarely wore hats outside. Only 1.5% reported that the majority of children always or usually wore long sleeves or long pants as a protective measure while outside, while 49% of centers reported that the majority never wore these clothes for sun protection.

Use of the outdoor play area increased by time of day (Table 1). In most centers (65%), children spent one hour or less outside during midday. Forty-six percent of centers reported that 50% or more of their outdoor area was shaded at noon. Among centers with less than a quarter of their playground shaded, 29% spent more than one hour outdoors compared to 41% for centers with more than three-fourths of their playground shaded. The percentage of centers following recommendations for sunscreen practice did not vary substantially by time spent outside.

Most centers (73%) reported having a written sun protection policy. However, the frequency of specific components among all centers ranged from 36% to 61%, with 23% reporting no written policies (Figure 1).

TABLE 1

Characteristics of Child Care Centers, Massachusetts, Summer, 2002 ($N = 327$)*

Average enrollment (number ± SD)	51 ± 83
Average % of Non-Hispanic White (% ± SD)	72 ± 32
Median income	$53,984
	no. (%)
Use of play area	
Morning before 10 a.m.	229(70)
Midday between 10 a.m. and 2 p.m.	281(86)
Afternoon after 2 p.m.	292(89)
Amount of time spent outside between 10 a.m. and 2 p.m. (in minutes)	
0	22(7)
1–15	8(2)
16–60	182(56)
61–120	91(28)
121–180	20(6)
181–240	4(1)
Available shade in outdoor play area	
<25%	56(17)
About 25%	122(37)
About 50%	110(34)
About 75%	28(9)
>75%	11(3)
Status of written sun protection policy	
Yes	240(73)
No	75(23)
Don't know	12(4)
Responsibility of sunscreen application	
Shared responsibility of families and center	293(90)
Family's responsibility	18(6)
Center's responsibility	16(5)
Daily practice in place for sunscreen application	278(85)
Centers with daily sunscreen practice	
Families asked to apply sunscreen before arrival	176(63)
Staff or families apply sunscreen upon arrival if not applied	154(55)
Sunscreen is applied before going outside in the morning	233(83)
Sunscreen is applied before going outside in the afternoon	254(93)
Sunscreen applied at least 20–30 minutes before going outside	
Yes	209(75)
No	68(24)

TABLE 1 *(Continued)*

Don't know	1 (<1)
Percentage of parents who deny permission for sunscreen application by center	
No parents deny permission	206(75)
<25%	58(21)
About 25%	5(2)
About 50%	6(2)
>50%	1(<1)

Note: Percentages may not add up to 100 because of rounding.
*Based on information reported by directors and assistant directors of child care centers.

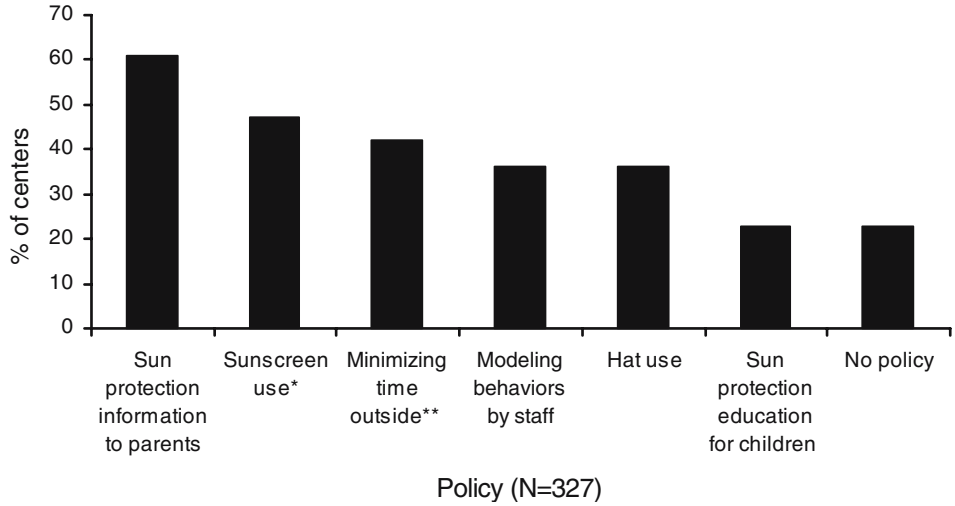
Although the majority of center directors and assistant directors (65%) worry about getting skin cancer themselves, concern about skin cancer was not associated with having a policy on sun protection ($r = 0.06$, $p = 0.33$).

Centers reporting a sun protection policy had an average of three of the six sun protection components, and only 10% of centers had all six components. The percentage of centers having one to six policy components was similar (Figure 2). Among centers with a sun protection policy, 80% included a policy to provide sun protection information to parents. Other policies included: advocating use of sunscreen with an SPF of 15 or higher (62%), minimizing time outside (56%), modeling sun-safe behaviors by staff (48%), wearing a hat outside (47%), and conducting sun education activities (30%).

Sun protection policies were positively associated with reported sunscreen use ($\chi^2=14.63$, $p = 0.0001$) and hat use ($\chi^2=30.98$, $p < 0.0001$), and inversely associated with time outside ($\chi^2=10.76$, $p = 0.001$) (Table 2). No confounders were identified. Centers with a majority of non-Hispanic White children (>75%) were more likely to have sunscreen practices ($\chi^2=17.77$, $p < .0001$) than centers with ≤25% non-Hispanic White children. Reported daily practice of sunscreen use was higher among centers with children spending 2 hours or less outside compared to centers with children spending more than 2 hours outside ($\chi^2=6.82$, $p = 0.009$). Compared to centers in the medium and high SES groups, centers in the low SES group had less daily use of sunscreen ($r = 0.18$, $p = 0.001$), had lower sunscreen ($r = 0.29$, $p < .0001$) and hat use ($r = 0.12$, $p = 0.02$), and were less likely to have a sun protection policy ($r = -0.14$, $p = 0.02$) and a policy stating that sun protection information will be provided to parents ($r = 0.17$, $p = 0.003$). Using the sun protection policy scale and the sun protection practices index, sun protection policies were positively

FIGURE 1

Status of sun protection policies in child care centers in Massachusetts.



*Sunscreen use was defined as using a sunscreen with an SPF of 15 or higher.
** Minimizing time outside was defined as minimizing the time spent outside between 10 a.m. and 2 p.m.

associated with practices ($r = 0.21$, $p = 0.0002$ when including long-sleeved clothing in the index, and $r = 0.23$, $p < 0.0001$ when excluding this factor).

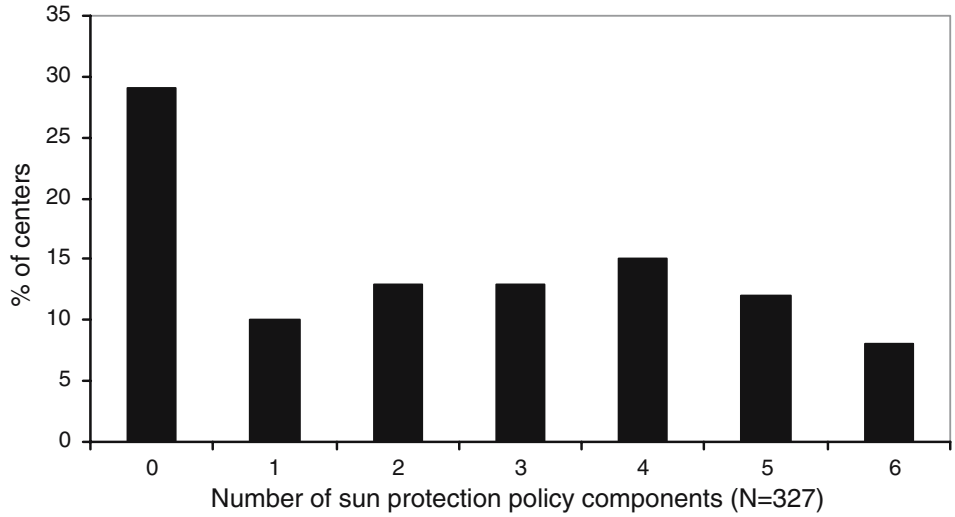
The majority of directors and assistant directors noted that the following measures would be most useful in increasing sun protection practices within the child care setting: brochures for parents or caregivers on the importance of sun protection in children (86%); a handbook designed to help child care centers develop a policy on sun protection (68%); and guidelines for making effective use of shade at child care centers (56%).

DISCUSSION

The findings of this study suggest that centers with sun protection policies are most likely to have regular sun protection practices that are consistent with recommendations. Many centers take advantage of multiple strategies for sun protection. Sunscreen use is widespread and most centers have preschoolers outside less than one hour during the peak UV period. However, not all practices are optimal. Although most centers rely on

FIGURE 2

Status of sun protection policies in child care centers in Massachusetts.



sunscreen as their primary sun protection strategy, many centers do not wait the recommended time for sunscreen to become effective. Use of hats and protective clothing as methods of protection were utilized much less frequently than sunscreen. As information on hat type was not collected, it is unknown whether the types of hats worn at these centers provided adequate protection. Although the use of protective clothing is a widely recognized strategy for sun protection, the percentage of centers (2%) that regularly use clothing as a protective measure is disconcertingly low. It may be unrealistic, however, for children to wear long sleeves on hot summer days.

Reducing unprotected time outside during mid-day is an important prevention message, especially when adequate shade is not available. However, centers that provide ample amounts of shade in high-use play areas and regularly use shaded areas for scheduled outdoor activities may not need to restrict time outside during this period. Use of shaded areas providing high UV protection may even allow children to spend more time outside, which is highly desirable in optimal weather. To protect against UV exposure, shade structures should block the line-of-sight path from most of the sky, in addition to that from the sun, as a minimum of 50% of solar UV radiation is received from the sky at temperate latitudes around noon in

TABLE 2

Policy Components and Practices: Sunscreen, Hats, and Time Spent Outside Between 10 a.m. and 2 p.m.

	% of group	
	Sunscreen policy	
	Yes (n = 147)	*No (n = 165)*
Sunscreen practices		
Never	0	3
Rarely	1	2
Sometimes	3	10
Usually	9	15
Always	87	69
	*(χ^2 = 14.63 p = 0.0001)	
	Hat policy	
	Yes (n = 113)	No (n = 202)
Hat practices		
Never	3	17
Rarely	14	29
Sometimes	44	42
Usually	26	11
Always	13	2
	**(χ^2 = 30.98 p < 0.0001)	
	Policy on time outside	
	Yes (n = 134)	No (n = 181)
Minutes spent outside between 10 a.m. and 2 p.m.		
0–15	20	10
16–60	78	96
61–120	29	58
121–240	7	17
	***(χ^2 = 10.76 p = 0.001)	

*Comparing always to all other groups combined.

**Comparing always or usually to all other groups combined.

***For consistency, the chi-square and p-value is reported. The Spearman rank-correlation coefficient $r = -0.19$, p = 0.001.

summer.[15] Single trees can provide low to high UV protection ranging from protection factors from around 4 to greater than 50.[16]

Few studies have surveyed sun protection practices and policies at child care centers. Two studies collected information on practices and policies; however, the association between them was not specifically assessed.[17,18] Two hundred licensed child care providers completed a written survey on sun protection practices and policies in the Denver metropolitan area.[17] Sunscreen use was the primary sun protection strategy, but only 54% reported that sunscreen was applied ''often.'' Fifty-six percent of centers in the Colorado study were classified as having an adequate policy, but the requirements were not defined.

A second study evaluated a random sample of 25 day care centers in central Connecticut by interviewing directors and observing the facility and sun protection practices of staff and children.[18] Although all centers stated that they applied sunscreen to children, none of these centers applied sunscreen 15–30 minutes before going outside. Additionally, none of the centers visited during early fall were using sunscreen on these days. Only two of the centers surveyed had a policy requiring all children to wear a hat before going outdoors, while one center had a policy requiring all infants to wear a hat outdoors. National or state guidelines on appropriate sun protection practices and policies tailored to the child care setting may be beneficial to increase knowledge of optimal practices and awareness of the range of sun protection strategies.

A recent study of Australian child care centers concluded that having a sun protection policy does not always translate into practice.[19] For example, 87% of centers reported having a policy requiring children to wear broad-brimmed or legionnaire-style hats, while only 36% reported this practice all of the time. However, other policy components such as playing in the shade and child sunscreen use had much higher percentages of centers reporting both having a policy and optimal practices. The discrepancy between the percent of centers reporting having a specific policy component and optimal practice may reflect the fact that certain policy components may be easier to enforce than others.

In this cross-sectional study, we could not evaluate the extent to which sun protection policies actually affected practices, or how general sun awareness was underlying both policy and practice. Although it is likely that having a sun protection policy leads to increased sun protection practices, practices may also lead to policy implementation. For example, centers may have implemented sun protection practices but may enact policies to increase compliance, address parental concern about sun protection, and inform parents. Second, SES of the centers was crudely measured by using median

income of the city of the center. We cannot be sure that children attending a specific center are the same children who reside in that city, especially during the summer when many centers close. However, using median income level may be an adequate proxy for income level of families whose children attend the center. Finally, we were unable to make direct observations at centers and did not verify statements regarding their sun protection policy.

The survey targeted directors and assistant directors who are likely to possess accurate information about their sun protection policies and current practices, particularly since we asked about 5-day recall. Thus, we could make valid comparisons between centers. However, since the survey was conducted by MDPH in collaboration with OCCS, the regulatory agency, participants may have over-reported their center's practices and policies. However, measuring summer practices may not be indicative of practices at other times of year. Future studies should assess sun protection practices in late spring or early fall.

A formal sun protection policy may be an effective way to increase sun protection practices in the child care setting. Our results suggest that instituting policy approaches in child care centers may result in improved sun protection practices and points to the potential for further integration of such approaches. Centers can promote sun safety by incorporating five elements into their policy including: (1) ensuring that an SPF 15+ sunscreen is adequately and appropriately applied, preferably 15–30 minutes before outside play; (2) promoting use of hats that protect the face, neck, and ears; (3) scheduling outdoor activities to reduce exposure during peak UV periods; (4) ensuring sufficient shade in the play area and placement of popular equipment in shaded areas; (5) including skin cancer prevention education in educational activities and providing educational material to staff and parents on sun protection. Resources should be made available to help centers implement these sun protection strategies, such as the names of suppliers who can provide low-cost sunscreen and appropriate hats, as well as information on cost-effective methods to increase available shade.

State and local government officials can play an important role in policy development by mandating that centers implement effective sun protection policies that address personal behavior, education, and environmental elements. Improving and expanding existing regulations may be a reasonable strategy to increase sun protection, especially in states where regulations are monitored and enforced. For example, a regulation requiring the outside play area to be at least 50% shaded during peak UV periods may be necessary to ensure that sufficient shade is available.

Further studies should be conducted to further explore the association between policies and improved sun protection practices.

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