A statewide survey of hazards in child care centers

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Abstract

Objectives—The purpose of this study was to determine adherence to selected recommended safety standards in North Carolina child care centers.

Methods—A self administered questionnaire eliciting information about safety practices in child care was mailed to a randomly selected sample of 409 North Carolina child care centers.

Results—One hundred and ninety five usable questionnaires were returned from child care centers in 75 counties. Results indicated that all of the standards included in the state's child regulations were being adhered to by at least 80% of the centers. However, adherence to recommended standards not included in the state's regulations was quite variable, with one standard implemented by less than 5% of the centers. The lowest rates of adherence were found for standards specifying that resilient surface material be used under playground equipment (4%) and that certain foods that may present a choking hazard to small children not be served (27%).

Conclusions—Many hazards not addressed in North Carolina child care regulations are present in child care centers. Some safety standards are not adhered to due to lack of knowledge or limited resources. Inclusion of national standards in state child care regulations appears to reduce, but not eliminate, the likelihood of hazards being reported. Further research should include on-site inspections and attention to safety in family child care.

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As the number of mothers entering the work force continues to increase, more American children are spending at least part of each day in out-of-home child care. Nearly 60% of mothers with children under 6 are working either full or part time.^{1,2} One study estimated that in 1990, 7.6 million children under the age of 13 were enrolled in child care centers and 4 million were in family child care homes.³ The majority of these children were under 6 years of age. With so many children being cared for outside of their own homes, it is important to determine how safe child care facilities are. Little information on hazards and injuries in child care has been routinely collected, but the data that do exist reveal problems, many of which are preventable.

Falls and collisions, both with objects and other children, seem to account for a large percentage of the injuries in child care facilities. One of the first studies to report on injuries to children in child care found that falls, both indoors and outdoors, accounted for 49% of the injury incidents.⁴ Several authors have reported that the playground was the site of the majority of injuries, accounting for 47–67% of the total incidents.^{5–7} Running and climbing outdoors were reported to be the activities most often associated with these injuries.^{6,8,9} Falls from playground equipment accounted for between 22% and 33% of the injuries.^{7,8}

National guidelines offer ways to reduce potential hazards in child care.^{10–13} However, recent studies reveal that many of the suggested strategies to reduce hazards are not widely used.^{14–17} For example, unsafe storage of toxic materials was a problem in 35–38% of the facilities,^{14,17} and between 11% and 17% of the facilities did not have working smoke detectors.^{14,17} Lack of impact absorbing surface material underneath playground equipment was the most common outdoor hazard (61–97%).^{14–17} In addition, researchers in one study noted that many centers that did have impact absorbing surface materials underneath equipment rarely used the recommended depths.¹⁶ Lack of suitable enclosures around playgrounds was a problem in 21–38% of the facilities.^{14,16,17} Furthermore, Sacks and associates found that as the number of hazards on the playground increased, so did the likelihood of a playground related injury being reported in the previous year.¹⁶

In 1992, 130 799 North Carolina children spent at least part of their days in child care facilities. The majority were cared for in licensed child day centers* of which 1972 were 'A' licensed and 489 'AA' licensed.† These accounted for 78% of all children being cared for in regulated out-of-home settings.¹⁸

Because there are no federal regulations for child care, individual states have the responsibility of developing and implementing such regulations. The problems of inadequate and/or inconsistent state regulations were reported by Runyan and associates,¹⁹ who compared 45 of the states on 36 specific safety criteria selected from three sets of national guidelines. For 24 of the 36 items, more than half the states' regulations were below the criterion or failed to mention the topic.

*According to North Carolina's *Child Day Care Requirements*, a day care center is 'Any day care facility which is authorized to provide day care for 13 or more children when any child present is preschool-age'.

†An 'A' license is 'The license issued to day care operators who meet the minimum requirements for the legal operation of a day care facility'. An 'AA' license is 'The license issued to day care operators who meet the higher voluntary standards promulgated by the Child Day Care Commission' (*Child Day Care Requirements*).

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The regulations governing the operation of child care centers in North Carolina represent the minimal requirements a facility must adhere to in order to operate as a licensed child care facility.²⁰ The purpose of this study was to assess the presence of hazards in a representative sample of licensed child care centers with respect to certain national guidelines within the context of state child care regulations. Our goal was to determine whether these facilities exceed the state's minimal requirements to ensure the safety of the children in their care.

Method

A self administered questionnaire was designed to assess the presence or absence of 18 safety standards and the procedures for record keeping about injury incidents. All of the standards addressed in the instrument are recommended by one or more of four sets of national guidelines.¹⁰⁻¹³ The specific standards included for study were selected to represent a range of types of potential, modifiable hazards that have importance in both indoor and outdoor injuries at child care facilities. The instrument had been developed and pilot tested with a smaller convenience sample of 65 child care providers in January 1992.²¹ This pilot study permitted improvements in question wording and identification of topics needing to be added to or removed from the instrument.

Funding permitted selection of a random sample of 17% (n = 409) of 'A' and 'AA' licensed centers from a list of all such facilities in the state. The 65 centers included in the pilot study were excluded. In May 1992, the questionnaire was sent to the directors of all the sampled centers. Confidentiality of their responses was assured. Two weeks after the initial mailing, reminder postcards were sent to non-respondents, and follow up phone calls were made two weeks later. Second questionnaires were sent to approximately 50 directors who had never received or who had misplaced the questionnaires they had originally been sent.

Results

THE SAMPLE

Two hundred and seven questionnaires (51%) were returned in the 10 weeks after the initial mailing of the surveys. Twelve responses were unusable because they represented centers governed by different regulations than licensed child care centers or were representative of multiple centers. The analysis thus focused on responses from the remaining 195 centers.

The respondents represented 75 of the state's 100 counties and included 40 owner directors, 123 non-owner directors, and 21 other staff. Eleven respondents did not specify their positions. All but five of the respondents were high school graduates; 66% had at least a four year college degree.

The centers represented a wide range of sizes. Though all centers included in the study population were authorized to care for 13 or more children, at the time of our study enrollment ranged from a minimum of six children to a maximum of 161. Sixty one centers had fewer than 29 children, 80 had between 30 and 79 children, and 54 had 80 or more children. The majority of centers, 146 of 195 (75%), were 'A' licensed centers; 49 (25%) had 'AA' licenses. Twenty four of the centers reported that they were accredited by the National Association for the Education of Young Children (NAEYC).

SUMMARY OF OVERALL FINDINGS

Responses were analyzed to describe the extent of self reported adherence to the specific safety standards addressed in the questionnaire (see table 1). Only 27% indicated that their centers never serve peanuts, chunks of hot dogs, whole grapes, or hard candy — all of which are associated with choking in young children. Thirty eight per cent (70 of 184) reported that, among these four foods, they only served hot dogs. The remaining 35% of providers reported that their centers served whole grapes, peanuts, hot dogs, or a combination of these three foods. No center reported serving hard candy to children. Slightly more than one fifth indicated that potentially poisonous substances (for example, pesticides, shampoos, detergents, disinfectants, other cleaners, and medicines) are sometimes stored in other than their original containers.

Twenty two child care providers stated that their centers did not have smoke detectors.

Table 1 Proportion of North Carolina child care centers reporting adherence to selected safety standards and presence of those safety standards in North Carolina (NC) child care regulations (n = 195)

Safety standards assessed in the questionnaire	% (No) Proportion of centers adhering to standards*	Specified in NC child care regulations?
Indoor hazards		
Peanuts, whole grapes, chunks of hot dogs, and hard candy are not served to children	27.2 (184)	No
Potentially poisonous substances such as cleaning supplies, pesticides, and medicines are stored in original, labeled containers	79.1 (182)	No
Firearms are not present in the facility	99.0 (194)	No
Fire/burn prevention		
Smoke detector present in facility	87.6 (193)	No†
Smoke detector tested on a monthly basis	25.0 (164)	No†
Hot water temperature does not exceed 120°F at outlet	94.2 (189)	Yes
Outdoor hazards		
There are at least 8 feet between pieces of play-ground equipment	47.8 (184)	No
All playground equipment is securely anchored	81.0 (195)	Yes
Maximum height of equipment does not exceed 6 feet	63.6 (187)	No
8 inches or more of resilient surface material underneath playground equipment	4.3 (186)	No
If a pool is present at the facility, it is surrounded by a fence 4 feet or higher or emptied when not in use	100.0 (14)‡	Yes§
Emergency procedures		
At least one staff person on premises who is currently certified in cardiopulmonary resuscitation	100.0 (194)	Yes
At least one staff person on premises who has successfully completed a first aid course within the last three years	99.5 (194)	Yes
911 or other emergency phone numbers posted in facility	100.0 (192)	Yes
Poison control center number posted in facility	79.7 (187)	Yes
First aid kit kept in facility	99.5 (192)	Yes
First aid kit contains syrup of ipecac	34.0 (162)	No
Records of children's injuries kept	91.1 (192)	No

*Refers to percentage of day care providers responding to each item. Denominators (numbers) vary due to incomplete responses by respondents.

†Refers to state fire code.

‡Only 14 providers indicated that there are pools present at their facilities.

§Specified for water deeper than 18 inches.

Among those who did report having a smoke detector, only 25% said that it was tested on a monthly basis, and almost half (46%) reported that their smoke detectors were tested only one to three times per year.

Nearly 48% indicated that there were at least 8 feet between the two closest pieces of equipment on their outdoor play areas, but 27% reported that there were fewer than 6 feet between the closest pieces of equipment. Though most respondents (81%) stated that their playground equipment was securely anchored to the ground, 37 (19%) reported that they had at least one piece of equipment that was not securely anchored, with 22 (11%) of them reporting that the piece of equipment was a teeter-totter. Nine respondents (5%) indicated that two or more pieces of equipment were not securely anchored.

Although 64% of providers stated that the maximum height a child could climb to on any piece of playground equipment was less than 6 feet, 10% indicated that they had equipment upon which children could climb to heights of 8 feet or more. Climbers accounted for 53% of the equipment specified, while slides and swings accounted for 41% and 6%, respectively.

Nearly 34% of respondents reported having dirt or grass underneath their sliding boards; 40% had dirt or grass under their climbers. Sand was also a common type of surface material, with 36% of providers reporting sand under their slides and 39% having sand under their climbers. However, only six centers reported using sand at the recommended depths of eight inches or more and only two centers reported using adequate depths of wood chips. Among those centers with equipment 6 feet or higher, only three had adequate depths of surface material under the equipment.

EMERGENCY PROCEDURES

North Carolina child care regulations specify that all child care centers must have one person certified in cardiopulmonary resuscitation and one person certified in first aid on the premises at all times. All but one of the providers reported meeting both these regulations. Several stated that all of their staff were certified in either cardiopulmonary resuscitation or first aid, and 55 reported having 100% of their staff certified in both cardiopulmonary resuscitation and first aid.

According to the providers, 911 and/or other emergency numbers were posted in all of the facilities surveyed, and the number for a poison control center was posted in nearly 80% of the centers. All but one reported having some type of first aid kit in the facility, but only 55 had a bottle of syrup of ipecac on the premises. Among these only 31 had an unexpired bottle.

Although not specifically required by the regulations, most respondents (91%) indicated that records of children's injuries were kept. Most (58%) kept records of all injuries, 20% kept records only for injuries requiring at least first aid, and 13% kept records only when medical attention was required. How the child

got hurt and the kind of injuries the child had were included in these records universally.

ADHERENCE TO STANDARDS BY SIZE OF CENTERS, TYPE OF LICENSE, AND ACCREDITATION STATUS

To determine if the size of the centers or the type of license had any relationship to adherence to recommended safety standards, nine standards that had shown at least 10%, but less than 90%, reported adherence were examined in terms of center characteristics. Neither the size of the center nor the type of license bore any relation to the number of hazards present. Only 24 centers reported that they were NAEYC accredited, and the reported presence of hazards in these centers was not different from the centers that were not NAEYC accredited.

ADHERENCE BY WHETHER OR NOT THE STANDARD WAS ALSO A REGULATION

Eight of the standards shown in table 1 were included in North Carolina child care regulations at the time of this study. All of these standards were reported as being adhered to by at least 79% of the centers, with adherence to six of the eight standards reported to be 90% or greater. Reported adherence to standards not included in the regulations was much more variable, ranging from a low of 4% for one standard to a high of 99% for another. In fact, for five of the 10 standards not included in the regulations, adherence was reported to be less than 50%.

HAZARD INDEX

A hazard index was created to determine how the presence of reported hazards was distributed among the centers. All standards listed in table 1 were included in the index with the exception of the item representing reported practices. The standard dealing with playground surfacing was expanded to four items. For each of the two most common kinds of playground equipment, slides and climbers, separate items representing appropriate surface material and adequate depth of surface material were created. Possible scores on the index ranged from 0 (none of specified hazards present) to 20 (all specified hazards present). The distribution of scores for all 195 centers is shown in the figure. Only 17 had three or fewer of the specified hazards present. No center had a hazard index score greater than 12. The mean number of hazards per center was six. The mean hazard index score did not vary by size of center or license type.

HOW COULD YOUR FACILITY BE MADE SAFER?

One hundred and seventeen providers (60%) responded to the open ended question 'What things would help you make your day care facility safer?' The most frequently appearing responses are summarized in table 2.

Specific types of training needs noted by

Distribution of hazard index scores among North Carolina child care centers ($n = 195$).

Table 2 Responses from providers in North Carolina child care centers to 'What things would help you make your day care facility safer?' ($n = 117$)

Response	No of times response appeared*
Training for staff	58
Additional funds	48
Improvements to playground	29
Guidelines/information	19
Additional staff	11
Larger facilities/additional space	8
Improve/increase regulations	6

*Because respondents could provide multiple responses, the total number of responses is greater than 117.

respondents included the following: training in supervising children; regular cardiopulmonary resuscitation and first aid classes for all or most of the staff; fire safety training; workshops on playground safety and indoor safety; injury prevention workshops, including poisoning prevention; instruction on sanitation principles; ideas for appropriate plans of instruction and activities, including creative ways to teach children indoor and outdoor safety.

The desire for additional funds was noted for a variety of purposes which included the following: to improve and maintain playgrounds; to purchase new equipment, both for playgrounds and the indoor facilities; to purchase safer toys; to hire additional staff; to pay staff higher salaries, and to provide benefits so more qualified/educated persons could be hired and retained; to pay for staff to attend training; and to purchase additional first aid supplies.

Several respondents noted that they would like to have additional safety guidelines. In particular, guidelines about playground safety (checklists) and age appropriate equipment were requested by some providers. Some mentioned that they wished the state would provide guidelines for implementation of new or updated child care rules and regulations should these be put into effect. A few respondents said that they would like to see changes to the present child care regulations, with more specific safety measures included and a more thorough licensing process.

The desire for additional staff was noted for

several purposes including to have someone with primary responsibility for inspecting and correcting unsafe situations; to have lower child/staff ratios; and to have additional staff to supervise children on the playground.

Seven respondents thought their centers were already as safe as they could be.

Discussion

Consistent with earlier studies, this study revealed that there are numerous hazards present in child care centers, particularly on the playgrounds.¹⁴⁻¹⁷ All centers had at least two of the specified hazards and 91% had four or more hazards. In addition, this study adds to the prior research by demonstrating that reported adherence to standards that were included in North Carolina child care regulations was much greater than reported adherence to standards that were not included in state child care regulations.

The greatest gaps between reported conditions and the standards appear to be on the playgrounds. Equipment that is too high and/or too close together, and lack of suitable type and/or depth of surface material underneath the equipment, appear to be the main hazards. Because falls from playground equipment have been found to be a significant cause of injuries in child care facilities,^{5,7,8} the presence of these hazards arouses particular concern. Impact absorbing surface materials such as sand, pea gravel, and wood chips maintained at depths of 8 to 12 inches are suitable surface materials for equipment 6 feet and higher.^{13,22} Falls from less than 1 foot onto concrete or asphalt, and falls from less than 4 feet onto dirt or grass, can result in serious or even fatal head injuries.¹³ Even though they are complying with North Carolina regulations that do not require impact absorbing surface material underneath playground equipment, centers that have equipment 4 feet high and higher and do not use impact absorbing surface materials have potentially life threatening conditions on their playgrounds.

Although the proportions of centers reporting adherence to standards included in state regulations were generally high, a different picture emerged when the safety standards that are not covered in the North Carolina regulations were examined. More than half of the safety standards considered in this study were not covered by state regulations, and reported adherence to these standards was variable. For example, the standards specifying that certain foods should not be served, that smoke detectors should be checked on a monthly basis, and that resilient surface material should be used on the playgrounds (none of which are included in North Carolina regulations) were only adhered to by between 4% and 27% of the centers. These findings suggest that improving North Carolina child care regulations could make North Carolina child care centers safer places for the children attending them.

The finding that 'A' centers and 'AA' centers did not show great differences in reported adherence to the safety standards addressed in

this study is not unexpected because the higher standards an 'AA' center must adopt do not specifically pertain to safety issues. However, it is interesting that the 24 centers that reported they were accredited by the NAEYC did not exhibit fewer hazards despite the more stringent requirements for accreditation. Specifically, NAEYC accreditation requires impact absorbing surface material beneath playground equipment, storage of chemicals and potentially dangerous substances in original, labeled containers, and smoke detectors that are regularly tested.¹¹ It may be that safety features implemented at the time of accreditation had been allowed to deteriorate over time. This finding may be explained by the accreditation process itself, which involves a self assessment validated by a peer review, but does not involve professionals who are skilled in observation of hazards.

WHY SAFETY STANDARDS ARE NOT IMPLEMENTED

Although the information obtained from the child care providers in this study does not directly reveal why specific safety standards are not in place, answers to the question 'What things would help you make your day care facility safer?' provide some insight. Many respondents noted their desires for various types of training for their staff, including injury prevention workshops and playground safety workshops. This might indicate that the reason some safety standards are not in place is because the providers do not know they should be in place, not because they are intentionally neglecting them. Furthermore, there are insufficient resources to implement many of the measures, especially those addressing playground safety. This is not surprising given the low budgets of most child care facilities and the priority of supporting personnel before making facility improvements. Child care providers may also be aware of hazards but may see hazards as a lower priority than other concerns. The fact that 44% of our respondents either did not answer this question or stated that their centers were already as safe as they could be is consistent with Sacks and Addiss' observation that there is a lack of awareness of the potential for injury prevention.²³

IMPLICATIONS

Prior research has reported mixed findings about the relative safety of child care centers and home care when examining injury as the outcome. (JB Kotch *et al*, paper presented at Third International Conference on Injury Prevention and Control, Melbourne 18–22 February 1996).^{24,25} This study, with a focus on the presence of hazards only in child care centers, indicates that improvements could be made in that setting, with potential benefits in injury reduction. Intervention on several levels may be appropriate. Given the better adherence to standards included in the state regulations, improvements in policy are important. This will require education of decision makers

about safety concerns and priorities for hazard reduction. To some extent, compliance with stronger regulations will likely be dependent on the increased awareness of both providers and parents. In addition, in the absence of stronger policy, education to encourage voluntary change is important.

Although North Carolina regulations do cover some important safety issues, there seem to be significant gaps in the topics covered. The fact that there was better reported adherence to areas covered by the regulations suggests that improvements in regulations can reduce potential hazards. Adoption of some of these standards does not require financial expenditure. Thus, there should be less opposition to incorporating them into the regulations. For example, testing a smoke detector once a month would only require one or two additional minutes of a staff member's time. In addition, if regulations that prohibited serving peanuts, chunks of hot dogs, grapes, and hard candy were put into effect, other food could easily be substituted.

Other changes, such as the installation of impact absorbing surface material and height restrictions on playground equipment, may require more resources and necessitate that state and local governments allocate or loan funds to facilities. To this end, efforts must be made to promote awareness of the potential hazards in child care facilities and to bring the need for changes in both regulations and funding to the attention of policy makers. Child care providers, persons trained in injury control, and parents can be instrumental in this process.

STUDY LIMITATIONS

Several limitations, many of which would tend to reflect underestimates of the presence of hazards, should be noted. First, although the sample was randomly selected to be representative of 'A' and 'AA' centers in the state, we cannot know if the centers that responded are truly representative. It is likely, however, that the directors who knew they were not adhering to some standards addressed in the questionnaire would have been less inclined to respond. Consequently, the results almost certainly present a more positive picture than actually exists.

The self reported nature of the data may also have biased the results. Although confidentiality was assured, the results may have been biased by some respondents answering the questions with what they knew to be the desirable answers rather than answers that represented the actual situations. This phenomenon is especially likely to have occurred for questions assessing adherence to the safety standards that are included in the North Carolina regulations, assuming the respondents would have known what the 'correct' answer was. Support for this assumption is shown by the fact that more variability was found in the responses to standards that are not included in the North Carolina regulations. This could be because more variability in

adherence to these standards actually exists or because fewer respondents knew what the most desirable answers were. Furthermore, respondents may have been more accurate in reporting characteristics of observable and stable features of the facility like playground structures, rather than practices such as the types of foods served that may vary by teacher or over time.

Measurement issues may have also affected the results. Several questions requested that the respondents make measurements of the height of, and distances between, playground equipment and of their hot tap water temperature. If the respondents simply estimated the answers, this may have biased the results. For example, the respondents may have estimated that their playground equipment did not exceed heights of 6 feet when some pieces actually did. In addition, missing values were coded as blanks and thus not included in the analyses, including the hazard index, possibly further underestimating the number of hazards.

Small sample size also may limit the generalizability of the results. The 195 centers whose responses were analyzed in this study account for approximately 8% of the 2461 'A' and 'AA' licensed centers operating in the state at the time of this study.¹⁸ However, the composition of the sample — 75% 'A' and 25% 'AA' centers — is reflective of the total distribution of centers by type of license in the state (80% and 20%, respectively).

In order to validate the respondents' self reports of hazards in North Carolina child care centers, a more thorough on-site inspection of the facilities should be conducted. In addition, the question addressing why certain safety measures are not presently being implemented (that is, why the hazards are present) must be addressed more thoroughly to determine priorities for intervention. Similar studies should be conducted in child care homes, especially small homes that are generally not monitored as closely as larger child care homes or centers, yet serve more than 10% of children in regulated child care in North Carolina. Furthermore, because there is no reason to believe that child care arrangements in North Carolina are unique, similar work should be done in other states across the US.

In conclusion, this study revealed that there are hazards, many of which are not addressed by North Carolina child care regulations, present in North Carolina child care centers. This study also revealed that the chances of adherence to standards seem to be enhanced when such standards are incorporated into state regulations.

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