13 Indicators of Quality Child Care: Research Update

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Overview

The purpose of this research brief is to provide guidance for state child care agencies as they think about revising their state child care regulations. The brief is based upon a synthesis of literature around the health and safety standards for out-of-home child care found in *Stepping Stones to Using Caring for Our Children*, using 13 predictor/indicator topics to provide focus. The brief examines evidence that exists to support how these standards protect children from harm. The audiences for this research brief are state administrators and policymakers, child care providers, and early childhood researchers. It combines two licensing measurement methodologies (Fiene & Kroh, 2000): 1) Licensing weighting and 2) indicator systems. Licensing weighting and indicator systems are two licensing measurement tools that have been utilized in the licensing literature for the past 20 years. These two methodologies are part of the *Licensing Curriculum* developed by the National Association for Regulatory Administration. These methodologies constitute the most researched tools for conducting inferential inspections by licensing agencies.

The National Resource Center for Health and Safety in Child Care utilized the two licensing measurement methodologies to develop a user-friendly, shortened assistance tool based upon *Caring for Our Children: National Health and Safety Performance Standards for Out-of-Home Child Care*, a comprehensive standards document containing over 900 standards. The shortened assistance tool, *Stepping Stones to Using Caring for Our Children* , is a statistically determined version of *Caring for Our Children* , based upon the most critical standards to protect children from harm in out-of-home child care. Employing the indicator system methodology, this research brief builds upon *Stepping Stones* by focusing on those standards that protect children from harm in child care. These standards are also key predictors regarding children's positive outcomes while in child care and are statistical indicators of overall compliance with child care regulations. The indicators in this brief contain a reduced number of standards from those presented in *Stepping Stones* . These standards have gone through a weighting consensus based on risk factors as well as an indicator methodology that selects standards on the basis of being able to predict overall compliance with standards and positive outcomes for children. As state regulations are rewritten, this brief will constitute a major step forward in support of state child care agencies as they attempt to ascertain which standards are the keys to protecting children.

This research brief is the final product of a lengthy process that started in 1979, when the Federal Interagency Day Care Requirements (FIDCR) were being drafted and the Department of Health, Education and Welfare (HEW) was looking for a streamlined tool for conducting monitoring reviews. The weighted licensing indicator system was just being developed in Pennsylvania (Fiene & Nixon, 1981) and this new methodology looked like a potential solution for the FIDCR standards. Although the FIDCR standards went through several drafts, the standards were never finished and implemented. However, the interest of HEW (became the Department of Health and Human Services (HHS) in 1980) in the weighted licensing indicator system methodology never wavered. A federal demonstration grant was given to Pennsylvania to further develop this methodology and begin pilot testing it in a consortium of states from 1980-1985 (Fiene, 1988). After 1980 it became clear that the monitoring focus for child care programs was shifting from the federal government to the states. HHS wanted to assist states in their monitoring efforts and felt that the weighted licensing indicator system was an innovative means for doing this.

During 1980's and early 1990's, many states utilized this methodology to help streamline their licensing enforcement systems. In 1994, a study from the U.S. General Accounting Office (GAO) estimated that 30 states were using the methodology in one form or another. The methodology has been used in child care and in other human services areas as well, including: mental health, early intervention, child welfare, and youth services (Fiene, 1988). During this time, a national data base was established at the

Pennsylvania State University in order to track the various state regulations that constituted respective states' weighted licensing indicator systems. The remarkable aspect of this data collection effort and data base was that a core set of indicators began to appear. Although the wording was not exact from state to state, every state had the same indicators appearing on their indicator checklists in some fashion. Thirteen key indicators consistently appeared. The 13 indicators were the following: child abuse reporting and clearances, proper immunizations, staff child ratio and group size, director and teacher qualifications, staff training, supervision/discipline, fire drills, administration of medication, emergency plan/contact, outdoor playground safety, inaccessibility of toxic substances, and hand washing/diapering.

From the early 1990's, the methodology began to gain the attention of national organizations that were interested in utilizing it outside of the licensing domain. For example, the National Child Care Association was interested in using it for their newly developing accreditation system (Fiene, 1992). In 1994, the Maternal and Child Health Bureau and the National Resource Center for Health and Safety in Child Care became interested in exploring a means for targeting certain standards in *Caring for Our Children* based upon the methodology. *Stepping Stones* is the product of that endeavor. However, only the weighting consensus portion of the methodology was utilized in the development of *Stepping Stones* . This research brief completes that process by incorporating the key indicator portion of the methodology.

This research brief updates reviews of recent research that is related to the 13 indicators that form the basis of the national database maintained at the Pennsylvania State University. It also lists the standards from *Caring for Our Children* that correspond to the 13 indicators. In many of the indicators, several standards are listed because the indicator was represented by different wording or emphases in the various state regulations. Therefore, when the comparison between the *Caring for Our Children* standards and the national data base of the state child care regulations was completed, many variations on each specific indicator were included.

The research brief then summarizes the research that has been completed in the 1990's and identifies gaps where additional research is needed. Following that, a summary table gives additional detail in an annotated bibliographic fashion on key studies that demonstrate the importance of the particular indicator. This research base and review clearly documents the importance of the 13 indicators when determining the health and safety of young children in child care and the overall quality of a program.

These key indicators support and embrace the overall research literature related to child care quality. Many of the indicators have been identified as key surrogates of child care quality that have an impact on young children and as being a reliable tool for identifying high compliant versus low compliant programs. The research literature over the past 20 years has demonstrated that these indicators accomplish two things. One, they statistically predict overall compliance with regulations in particular states. And two, a significant relationship exists between compliance with these indicators and positive outcomes for young children (Fiene, 1994).

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Introduction

The Office of the Assistant Secretary for Planning and Evaluation and the Bureau of Maternal and Child Health in the U.S. Department of Health and Human Services have commissioned this research brief through an interagency agreement; it was developed from a comprehensive literature search conducted by the National Resource Center for Health and Safety in Child Care.

The purpose of this research brief is to review and to provide an analysis of the research literature focused on 13 key licensing indicators of quality in child care. These 13 indicators were used in the development of *Stepping Stones to Using Caring for Our Children* (1997). *Stepping Stones* is a publication developed from the *National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs* [*Caring for Our Children*(*CFOC*)] to identify those standards most needed for the prevention of injury, morbidity, and mortality in child care settings. The National Resource Center developed *Stepping Stones* and is currently revising the *National Health and Safety Performance Standards* .

The 13 key licensing indicators, empirically identified in the research literature (Fiene & Nixon, 1981, 1983; Fiene, 1988; Fiene, 1994), have been part of a generic child care regulatory database for the past two decades. This database has been used by many states in the development of their respective licensing indicator systems.

This research brief will highlight the latest pertinent research studies related to the 13 indicators that have been completed since the publication of the *National Health and Safety Standards* in 1992. The research brief will also focus on gaps in the research literature where additional empirical research needs to occur. In some cases, research going back further than the last decade was used because of the classic nature of the studies and their significance to the 13 key indicators. The 13 indicators are the following: child abuse reporting and clearances, proper immunizations, staff:child ratio and group size, director and teacher qualifications (two indicators), staff training, supervision/discipline, fire drills, administration of medication, emergency contact/plan, outdoor playground safety, inaccessibility of toxic substances, and handwashing/diapering. The order in which the indicators are reviewed in this research brief is arbitrary and does not reflect the degree of risk associated with an indicator.

This research brief is organized by indicator, followed by each related standard from *Caring for Our Children*. Next, the latest empirically-based research that demonstrates the importance of the indicator and any noted gaps in the research literature are listed. Finally, a summary table that lists pertinent research citations related to each indicator is included. When fewer research citations were available, the summary table of research selections mirrors the research cited in the review section. When many research selections were available, the summary table and the research review sections are very different due to the large number of research citations. A conclusion summarizing the results of this research brief concludes the document.

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Child Abuse Indicator

The following list of standards based upon *Caring for Our Children* (CFOC) are taken from the National Data Base of Key Weighted Licensing Indicators that is maintained at the Pennsylvania State University. This national data base maintains all the state licensing regulations that fall under this particular indicator. State regulations are sometimes worded a bit differently or emphasize different aspects of this indicator. Therefore, in comparing the national data base of state regulations with CFOC standards, several different standards are selected for inclusion under this particular indicator. Twelve standards from CFOC were selected because states measure the child abuse indicator in 12 different ways.

Caring for Our Children (CFOC) Standards (1992):

HP 094: The facility shall report to the department of social services, child protective services, or police

any instance where there is reasonable cause to believe that child abuse, neglect, or exploitation may have occurred.

HP 095: Caregivers and health professionals shall establish linkages with physicians, child psychiatrists, nurses, nurse practitioners, physicians' assistants, and child protective services who are willing to provide them with consultation about suspicious injuries or other circumstances that may indicate abuse or neglect. The names of these consultants shall be available for inspection.

HP 096: Caregivers must be aware of the common behaviors shown by abused children and, if many such children are in the center, make special provisions for them by the addition of staff.

HP 097: Caregivers who report abuse in the settings where they work shall be immune from discharge, retaliation, or other disciplinary action for that reason alone, unless it is proven that the report was malicious.

HP 098: Employees and volunteers in centers shall receive an instruction sheet about child abuse reporting that contains a summary of the state child abuse reporting statute and a statement that they will not be discharged solely because they have made a child abuse report.

HP 099: All caregivers in all settings and at all levels of employment shall know the definitions of the four forms of child abuse and shall be able to give examples. They shall know the child abuse reporting requirements as they apply to themselves, and how to make a report.

HP 100: Caregivers with a year of experience in child care, and all small family home caregivers, shall know the symptoms and indicators of abuse that abused children may show. They shall know the common factors, both chronic and situational, that lead to abuse, and some ways of helping persons who are prone to abuse to avoid committing abuse. These symptoms and indicators shall be listed in the written policies.

HP 101: Center directors shall know methods for reducing the risks of child abuse. They shall know how to recognize common symptoms and signs of child abuse.

HP 102: Caregivers shall have ways of taking breaks and finding relief at times of high stress (e.g., they shall be allowed 15 minutes of break time every four hours, in addition to a lunch break of at least 30 minutes).

HP 103: The physical layout of facilities shall be arranged so that all areas can be viewed by at least one other adult in addition to the caregiver at all times to reduce the likelihood of isolation or privacy for individual caregivers with children, especially in areas where children may be undressed or have their genitals exposed.

HP 104: Caregivers shall be knowledgeable about the symptoms and signs caused by sexually transmitted diseases (STDs) in children. They must refer such children for care by calling the health care provider as well as the parent in order to be certain that the child is taken for care. They must determine from the health care provider when the child may return to the site and what precautions, if any, are needed to protect other children. Caregiver training on these items shall be documented.

ST 034: Directors and large family home caregivers shall check references and examine employment history before employing any staff, including substitutes, who will be alone with a child or a group of children in child care.

Research Review/Gap Analysis:

A major concern of parents when they drop their children off at child care is the safety of their children in the hands of the caregivers. The abuse of children in out-of-home settings has generated a good deal of concern. However, all documented research in this area indicates that fewer instances of abuse occur in child care programs than in homes or residential facilities (Finkelhor & Williams, 1990; Goldman, 1993; Margolin, 1991). If abuse does occur, though, parents must be aware of several signs that are cause for concern. According to research, physical abuse most frequently occurs in the form of excessive discipline, often as a response to prior conflict with the child. Sometimes, excessive discipline may have been inadvertently supported by parental permission for corporal punishment. Although sexual abuse occurs less frequently in centers than in homes, the effects of sexual abuse on the child seems worse in centers. Sexual abuse often involves physical abuse (Schumacher & Carlson, 1999).

Several things that a program can do to foster an effective and harm-free child care experience include increased caregiver support (high staff-child ratios, sufficient breaks, etc.), a model of care, a focus on positive behavior, a consumer orientation, training opportunities, program evaluation, and an internal program audit (Daly & Dowd, 1992). Any effective staff development program incorporates these elements. When the staff is fully supported with these elements, the risk for abusive behavior decreases substantially. Research (Reyome, 1995) has also shown that satisfaction in the role of child care worker is inversely related to abusive attitudes. However, overall competence and feelings of efficacy in the role of child care worker are not significantly related to abusive attitudes.

Other research (Thompson, Laible, & Robbennolt, 1997) indicates that child maltreatment might be prevented through child care programs that offer social support, parent networking, child-rearing advice, and informal counseling to troubled parents. This idea is attractive in the abstract, but it is often difficult to implement. The Thompson et al. study examines the nature of social support and its efficacy in preventing child abuse and neglect, the characteristics and needs of abuse-prone parents, the roles of child care providers, and the institutional and economic conditions that can make child care programs uniquely valuable but challenging settings for assisting families at risk.

Another area that should be addressed is the caregiver's ability to recognize abuse when it has occurred. Research (Wurtele & Schmitt, 1992) indicates that child care personnel know significantly less about the procedures for reporting suspected abuse and their protection under the law when compared to child sexual abuse experts. While child care staff are potential resources for abused children, they may fail to report suspected abuse if they do not know their legal responsibilities and their rights and protections under the law. These researchers have made suggestions for improving child care workers' knowledge about reporting suspected sexual abuse cases. A basic educational program clearly delineating the legal responsibilities of staff, including requirements for reporting, is needed.

Linking nurses with child care programs seems to be a viable alternative (Mondor & Wray, 1994). Such an innovative program was implemented in Edmonton, Alberta, Canada, in which a health program focusing on child abuse and neglect was linked with local child care programs. This program grew out of a study done by O'Mara and Chambers in which 53 percent of child care operators felt they needed more information on child abuse and how to detect potential abuse related to children in their care.

User manuals can also be excellent training tools. One user manual of particular note was developed by the National Center on Child Abuse and Neglect, titled *Caregivers of Young Children: Preventing and Responding to Child Maltreatment.* Another good user manual is the *Arkansas Healthy Children Handbook (1998*), which has an excellent section on Child Maltreatment. The American Camping Association has an excellent guide, *For Their Sake: Recognizing, Responding to, and Reporting Child*

Abuse (1992). Additionally, a Teaching Strategies text called *Caring for Infants and Toddlers: A Supervised, Self-Instructional Training Program (Volume I)* (1991) has an exceptional chapter that recognizes child abuse and neglect. All of these handbooks, texts, and manuals are useful tools to be used for training child care staff on what to look for and how to report suspected child abuse and neglect. These tools also provide directors of child care programs with helpful information on designing a prevention program at their child care centers.

The community context in which child abuse and neglect takes place may influence both reporting and outcomes of investigations into such incidents (Craft & Staudt, 1991). The general purpose of the Craft & Staudt (1991) study was to determine if two types of communities (rural and urban) would present differences in the reporting and substantiating of possible child neglect situations. For example, although where one lives (rural or urban) does not significantly influence the projected likelihood of a situation being reported as neglect; considerable agreement exists between urban and rural respondents on what should be reported as neglect. Even so, workers in both communities did not agree about what would be substantiated in those communities. To further clarify this issue, Groeneveld and Giovannoni (1977) found that if a complaint was reported by a professional source it was more likely to be substantiated than if reported by a relative or neighbor.

Summary Table:

Citation: Margolin (1991), Abuse and neglect in non parental child care: a risk assessment, *Journal of Marriage & the Family*, 53(3):694-704.

Summary: Interviews were conducted with 982 mothers of young children to assess factors related to children's risk of abuse and neglect by non parents temporarily responsible for child care. The target populations consisted of mothers who had given birth to at least one child during the previous six years (May 1984 through April 1990). Mothers were identified through certificates of live births located in the courthouse of a Midwestern county. Equal numbers of mothers were randomly selected from each month of the survey years. One hundred twenty-five mothers (13% of those surveyed) said that one or more of their children had been harmed or neglected by a nonparental caregiver. The strongest correlates of child abuse were caregiver gender and age. Although males were responsible for only 6.1% of non parental child care, they committed 40% of the child abuse. Adolescents performed 8.5% of non parental child care but committed 44% of the child abuse. Children were significantly less likely to be abused in a day care center or preschool than in home-based child care. The strongest correlates of neglect were the child's age, the caregiver's age, and the child care setting. Babies under the age of one year were three times more likely to be neglected, adolescent caregivers were twice as likely to be neglectful, and as was true of child abuse, home-based care was the setting with the greatest risk.

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Citation: Bybee & Mowbray (1993), An analysis of allegations of sexual abuse in a multi-victim day care center case, *Child Abuse and Neglect*, 17(6):767-83.

Summary: This study applied criteria from Statement Validity Analysis (SVA) protocols to aggregate record review data of alleged sexual abuse of over 100 children in a day care center. The use of SVA criteria supported the veritability of allegations in this case, with the data analysis reflecting consistency, logical structure, and spontaneity of allegations.

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Citation: Wurtele & Schmitt (1992), Child care workers' knowledge about reporting suspected child sexual abuse, *Child Abuse & Neglect*, 16(3):385-90.

Summary: As reports of the sexual abuse of preschool aged children increase and the number of children in day care expands, it is important to recognize child care workers as potentially important resource persons for sexually abused preschoolers. Although they are potential resources for abused children, they may fail to report suspected abuse if they do not know their legal responsibilities and their rights and protections under the law. The purpose of this study was to determine child care worker's knowledge about their reporting rights and responsibilities. Relative to child sexual abuse experts, day care personnel knew significantly less about the procedures for reporting suspected abuse and their protection under the law. Suggestions for improving child care workers' knowledge about reporting suspected sexual abuse cases are provided.

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Citation: Bassoff & Willis (1991), Requiring formal training in preventive health practices for child day care providers, *Public Health Reports*, 106(5):523-9.

Summary: The study was a test of the feasibility of mandating training in preventive health practices for child day care providers in California. Three approaches were taken to determining the feasibility of mandatory training. They were (a) to identify persons and groups with the capability to provide training, (b) to identify systems and networks for communication and collaboration on health issues related to day care at the local level, and (c) to determine the child day care providers' concerns, needs, and future interests regarding child health. Information was collected on relevant courses offered by universities, colleges, and adult education programs; on training offered by child health authorities; and on formal curriculums offered by local and national sources. Day care center and family day care home providers were surveyed to determine their knowledge of child health issues, their concerns, and their future needs. The providers surveyed cared for a total of 14,340 children. Information on local networks was obtained from the surveys, from interviews, and from a special task force that had been set up to advise the State legislature. Study results supported the conclusion that a coordinated system of State-wide training was feasible, given the existing networks of training and educational resources, the number of day care providers who had already been motivated to seek some training in child health practices, and the almost unanimous interest among day care providers in obtaining training. Mandatory training in child health for day care providers will require a commitment in the form of new legislation outlining basic requirements and allocating funding. The implementation and costs of such a mandate at the State and local level are discussed.

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Citation: Craft & Staudt (1991), Reporting and founding of child neglect in urban and rural communities, *Child Welfare*, 70(3):359-70.

Summary: The community context in which child abuse and neglect takes place may influence both reporting and outcomes of investigations into such incidents. This study examines and contrasts urban versus rural community perceptions of neglect by lay citizens and protective service workers.

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Citation: Cohen (1998), Bettering your odds of not getting sued, *Child Care Information Exchange*, 123, 74-78.

Summary: Reviews five serious issues that can result in lawsuits against child care centers and suggests ways directors can make them less likely. Discusses suits resulting from: injuries to a child; sexual abuse of a child; contractual matters with parents; wrongful termination of employees; and failing to care for a child with special health needs.

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Citation: Goldman (1995), Recognizing child abuse and neglect in child care settings, *Day Care & Early Education*, 22(3):12-15.

Summary: Draws attention to the prevalence of child abuse in homes, and discusses the extent of the problem—its definition and its physical, behavioral, and environmental indicators. Discusses the child care worker's role in knowing how to report the crime, teaching a child how to prevent it, and combating it by being informed and aware personnel.

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Citation: Daly & Dowd (1992), Characteristics of effective, harm free environments for children in out of home care, *Child Welfare,* 71(6):487-96.

Summary: Discusses specific elements that can foster effective and abuse free out of home care, increase program effectiveness, and reduce negative outcomes such as staff burnout. Elements include caregiver support, a model of care, a focus on positive behavior, a consumer orientation, training, program evaluation, and an internal program audit.

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Citation: Mondor & Wray (1994), What's the matter with Johnny? …telltale signs of child abuse and neglect, *Canadian Nurse* , 90(4):35-8.

Summary: Day care workers must be able to recognize and respond to the telltale signs of child abuse and neglect. They also need a sound understanding of the services available to these children and their families. Nurses can help.

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Citation: Schumacher & Carlson (1999), Variables and risk factors associated with child abuse in day care settings, *Child Abuse & Neglect*, 23(9):891-898.

Summary: Identified variables associated with abuse of children in day care centers and homes and specified risk factors. Literature regarding physical (PA), sexual (SA) and ritual child abuse (RA) was reviewed, focusing on identification of variables associated with victims, perpetrators, and settings. PA most frequently occurred in the form of over discipline, was a response to prior conflict with the child, and may have been inadvertently supported by parental permission for corporal punishment. SA often include PA and occurred less frequently in centers than in homes, but effects on the victim seemed worse in centers because severity was worse. A Satanic overtone frequently associated with RA, and RA with SA was most devastating. Effects were not temporary. Males predominated the perpetrator profile. Multiple perpetrator abuse was worse. Failure of center staff to report suspicion of abuse by fellow staff or parents was cited as a worry by several researchers.

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Citation: Thompson, Laible, & Robbennolt (1997), Child care and preventing child maltreatment, in Dunst & Wolery (Ed.), *Advances in early education and child care*, Vol. 9, 173-202.

Summary: Examines the nature of social support and its efficacy in preventing child abuse and neglect, the characteristics and needs of abuse prone parents, the roles of child care providers, and the institutional and economic conditions that can make child care programs uniquely valuable but challenging settings in which to assist families at risk.

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Citation: Zellman (1992), The impact of case characteristics on child abuse reporting decisions, *Child Abuse & Neglect*, 16(1):57-74.

Summary: Surveyed 1196 mandated reporters (physicians, social workers, psychologists, principals) about their child abuse reporting behavior, using vignettes in which case and characteristics were systematically varied. Data reveal that abuse relevant judgments and reporting intentions varied as a function of case characteristics. Three case characteristics (previous abuse, severity of abuse, and recantation) were powerful predictors of vignette outcomes. Previous abuse led to judgments of greater seriousness. When the alleged victim retracted his/her accusation on questioning by an authority figure, respondents were significantly less likely to intend a report. Child age, perpetrator intent, and family socioeconomic status also influenced abuse relevant judgments and reporting intentions. Respondents were more likely to intend a report (make a report) when younger children, lazy or angry perpetrators, and children from poorer families were portrayed.

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Citation: Haldopoulos & Copeland (1992), Case studies of child care training volunteers found to be at risk for abuse, *Early Child Development & Care*, 68, 149-158.

Summary: Conducted a comprehensive screening and training program designed to train women interested in obtaining jobs as infant caregivers. Over 100 women registered for training over a three year period, most of them low socioeconomic status urban dwellers seeking minimum wage jobs in the suburbs. Subjects were administered an open ended screening interview that assessed past history, child care knowledge, and individual personality dynamics. Ten percent of subjects were screened out of the program because they were rated as being high risk for child abuse. The case histories of six subjects are presented to illustrate the dynamics involved in the high risk rating, which included history of physical abuse, potential emotional abuse, and sources of anger. All of the high risk subjects sincerely saw themselves as potentially good child care providers, indicating the need for effective screening of potential child care providers.

Additional Resources:

National Clearinghouse on Child Abuse and Neglect Information
330 C Street, SW
Washington, DC 20447
Phone: 800-394-3366
Fax: 703-385-3206

National Committee for the Prevention of Child Abuse
PO Box 2866
Chicago, IL 60690-9950
Phone: 312-663-3520
http://childabuse.org

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Immunizations Indicator

This indicator only has one standard selected because the ACIP and AAP are the standards in the field related to immunizations for young children.

CFOC Standard (1992):

APP 26—the latest version of the Advisory Committee on Immunization Practices (ACIP) of the U.S. Public Health Service and the American Academy of Pediatrics (AAP) immunization schedule.

Research Review/Gap Analysis:

Since child care settings are associated with outbreaks of illness, and attendees have more frequent and severe infectious illnesses and receive more antimicrobial agents than children cared for at home, the increased use of child care has significantly impacted the epidemiology and cost to society of infectious diseases in the United States (Holmes, Morrow, & Pickering, 1996).

Immunizations are both a process indicator and an outcome indicator, which help protect children not just during childhood but for the rest of their lives. Immunizations are one of the most effective means for controlling the spread of infectious diseases in child care. Young children in child care face a greater risk of acquiring infectious diseases as compared to older children and adults (Pickering & Solomon, 1994). Licensed child care facilities typically require up-to-date immunizations for entrance, so vaccine-preventable diseases should have a reduced incidence compared to the general population. For example, the use of the Hib vaccine has led to a dramatic decline in the incidence of invasive disease caused by haemophilus influenzae type B.

Though immunization rates in child care have increased over the years, higher overall immunization rates are still needed. Linking child care payments to immunizations is one approach. Most parents believe immunizations should be undertaken for health reasons rather than monetary reasons and are ambivalent about linking child care payments to immunizations. However, research (Bond, Nolan, & Lester, 1999) has shown that immunization levels in child care could be increased by as much as 10% with this strategy. Responses from parents indicate that opportunistic immunizations (e.g., immunizations given at child care facilities or in a mobile immunization van) and evening immunization services would be welcome changes to current immunization services. This study suggests that both flexible immunization provision and government incentives may work together to increase immunization rates.

Statewide systems can help by keeping track of immunization rates and enacting systems for continued improvement. ECELS—Early Childhood Education Linkage System, in Pennsylvania, is a very effective and highly evaluated program where the licensing inspection system shares data with ECELS on a quarterly basis so that ECELS can follow up with sites that are having difficulty meeting

immunization standards. This is a unique partnership between a state agency and one of its contractors (Fiene, 1995). Another study (O'Mara & Isaacs, 1993) demonstrated that reviewing and monitoring child care center records increases the reported rate of correctly immunized preschool children. Other studies have also shown that monitoring records increases compliance with guidelines (Aronson & Aiken, 1980). ECELS has utilized the latest computer technology by using software algorithms to determine vaccine compliance for children. Not only does this technology track children's immunization status, it holds particular promise in producing positive change by following up with programs that have low compliance levels.

Two very important studies regarding illnesses in child care that have been conducted by the Washington Department of Public Health and the Centers for Disease Control and Prevention (MacDonald et al. 1997, Cordell et al. 1997). These studies address illnesses and absence due to illness among children who attend child care facilities in Seattle-King County, Washington. The first study (Cordell et al., 1997) compared incidence of illness and absence among children attending child care homes and child centers. The other study (MacDonald et al., 1997) explored passive surveillance for communicable diseases, seeking to develop and evaluate models for public health surveillance of illnesses among children in out-of-home child care facilities. States can consider the alternative models that these two studies provide when attempting to establish and implement a statewide surveillance system for tracking illnesses in child care.

Summary Table:

Citation: Bond & Lester (1999), Immunization uptake, services required and government incentives for users of formal day care, *Australian & New Zealand Journal of Public Health,* 23(4):368-76.

Summary: To determine immunization uptake in children attending formal day care prior to the introduction of certificates and parent incentives, and to document parent and child caregivers' attitudes to these strategies. In 1997, 60 child care centers and 300 family day care providers in suburban Melbourne were randomly sampled. Immunization dates, service use and preference, and views on government incentives were obtained from parents of children under three years of age. Providing client focused, flexible immunization services and government incentives and legislation may work together to boost immunization levels for those in formal child care.

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Citation: Ferson (1997), Infection control in child care settings, *Communicable Diseases Intelligence,* 21 (22):333-7.

Summary: Over one-third of all under 5-year-old Australian children use some form of licensed child care. The majority of research on infectious diseases in children using care, mainly emanating from North American and Scandinavia, suggests that children in preschool or long day care suffer more frequent infections and more days of illness than those cared for a home or in family day care. In order to minimize these risks it is necessary to apply infection control principles. In this study infection risk factors are outlined and recommendations for immunization, preventative practices, the use of antibiotics and outbreak management are presented.

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Citation: O'Mara (1993), Evaluation of registered nurses follow-up on the reported immunization status of children attending child care centers, *Canadian Journal of Public Health,* 84(2):124-7.

Summary: The purpose of this study was to evaluate whether follow up by nurses increased the reported rate of correctly immunized preschoolers in child care centers. Records from 14 randomly selected child care centers from the Hamilton-Wentworth area (n=514 records) were assessed for the number of correctly immunized preschoolers by two nurses operating in different centers. The nurses advised the centers about all incomplete records and reminded parents to update their child's immunization status. One nurse revisited all her assigned centers two to five weeks later. Both nurses returned to the child care centers to reevaluate the records two to eight months after the initial contact. Three hundred and eighty-two records were available for the second review (25% drop out rate). The reported rates increased significantly for all immunizations. There was no difference when the follow up intervention was greater. This study suggests that monitoring records improves the completeness of records in child care centers.

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Citation: Fiene (1995), Utilizing a statewide training system to improve child day care quality, *Child Welfare* , 74(6):1189-1201.

Summary: Describes Pennsylvania's comprehensive child day care and early childhood development training system, focusing on the Early Childhood Education Linkage System (ECELS) and its immunization initiative. The initiative was established to improve the overall immunization status of all children in child day care in the state.

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Citation: Carter & Bumpers (1992), We must immunize every child by two, *Dimensions* , 20(2):5-6.

Summary: Discusses the development and initial implementation of the "Every Child By Two" project. The project is designed to immunize as many newborn through two year old children in the United States as possible against communicable childhood diseases and to create a program to systematically immunize this age group in the future.

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Citation: Middleton (1995), Child care diseases: the risks—and how to minimize them, *Consultant* , 35 (2):195-8.

Summary: Is it safe to send a child with a temperature of 100 degrees F to child care? How soon after the start of therapy can a preschooler with conjunctivitis return to child care? As the number of children attending such facilities rises, you can expect to hear more of these questions form anxious parents. You can help reduce the risk of infectious disease transmission by making sure that vaccination is up to date in all preschoolers; also, pneumococcal vaccination is mandatory for children 2 years and older with serious pulmonary, cardiac, or hematologic illnesses. Give parents a checklist of safety features to consider when they are looking for a child care center; remind them that the risk of injury can be lowered by such measures as continuous staff supervision, use of child safety devices, and provision of foods and toys that cannot easily be aspirated.

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Citation: Pickering & Solomon (1994), Day care infections: children at risk, *Patient Care,* 28(9):118-21.

Summary: Day care centers provide a setting for transmission of respiratory and GI infections. Proper immunization, preventive measures, and prompt reporting of outbreaks are the keys to control.

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Citation: MacDonald, Boase, Stewart, Alexander, Solomon & Cordell (1997). Active and passive surveillance for communicable diseases in child care facilities, Seattle-King County, Washington. *American Journal of Public Health*, 87(12), 1951-55.

Summary: This study presents the results of a 1992 project by the Seattle-King County Department of Public Health and the Centers for Disease Control and Prevention to develop and evaluate models that could be used for public health surveillance in child care settings. The study was to determine the feasibility of active public health surveillance in child care settings. The surveillance objectives were to 1) rapidly detect illness outbreaks in particular facilities, 2) give local health officials information on the scope and patterns of illnesses among children in child care, and 3) create a channel for information sharing between child care providers and the Department of Public Health. The study was conducted from July 1992 through March 1994. It began with active surveillance, but changed to passive surveillance based upon the increased effort needed from both child care and the Department of Public Health staff to maintain the system. The study discusses the implementation of the two surveillance models pointing out the pluses and minuses of both approaches.

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Citation: Cordell, MacDonald, Solomon, Jackson, & Boase (1997). Illnesses and absence due to illness among children attending child care facilities in Seattle-King County, Washington, *Pediatrics* , 100(5), 850-855.

Summary: Although much of the economic impact of child care associated illness in the U.S. is due to parents' time lost from work, there are no data on the incidence of absence due to illness among children in various types of out-of-home child care settings. The goals of this study were to compare the incidence of illness and absence due to illness among children attending child care centers and child care homes. From July 1992 through June 1993, child care providers from 91 child care homes and 41 child care centers in Seattle-King County, Washington, provided information on absenteeism and illness for 96,792 child-weeks of observation. The age-adjusted incidence of provider-reported illness episodes among children in child care homes was greater than that among children in child care centers. The age-adjusted incidence of absence due to illness among children in child care homes was less than that among children in child care centers. Results comparing the incidence of illness between children in various types of child care settings may be influenced by information sources. The incidence of illness among children in child care homes may be greater than that among children in child care centers. The increased incidence of absence due to illness among children in child care centers compared with that among children in child care homes probably reflects differences in exclusion and attendance policies and practices between there two types of settings.

Additional Resources:

American Academy of Pediatrics (AAP)
141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
Phone: 847-228-5005
Fax: 847-228-5097

http://www.aap.org/

Centers for Disease Control
National Immunization Program
1600 Clifton Road
Building 16, D25
Atlanta, GA 30333
Hotline: 1-800-232-2522
http://www.cdc.gov/nip/

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Staff Child Ratio and Group Size Indicator

These indicators only have one standard represented because in the national data base a specific state regulation that deals with staff child ratio and group size exists. Even so, the variation of these regulations among the states is great. While some states meet or almost meet these standards for staff child ratio and group size, many states do not. Of all the indicators, the greatest variation occurs in how state regulations match up with the national standard for staff child ratio and group size.

CFOC Standard (1992):

ST 002—Child:staff ratios for centers and large family child care homes shall be maintained as follows during all hours of operation:

Age	Child-staff ratio	Maximum group size
Birth-12 months	3:1	6
13-24 months	3:1	6
25-30 months	4:1	8
31-35 months	5:1	10
3 year olds	7:1	14
4 year olds	8:1	16
5 year olds	8:1	16
6-8 year olds	10:1	20
9-12 year olds	12:1	24

When there are mixed age groups in the same room, the child:staff ratio and group size shall be consistent with the age of the majority of the children when no infants or toddlers are in the mixed age group. When infants or toddlers are in the mixed age group, the child:staff ratio and group size for infants and toddlers shall be maintained.

Research Review/Gap Analysis:

Health

Review of all the major research in child care clearly demonstrates the importance of maintaining

appropriate child:staff ratios and group sizes. Child:staff ratios and group sizes are two of the best indicators for determining the quality of a child care program and they significantly effect many other health and safety issues. Smaller group size is associated with a lower risk of infection in child care. The risk of illness in children between the ages of one and three years of age increases as the group size increases to four or more, whereas children in groups of three or fewer have no more risk of illness than children cared for at home (Bartlett, Orton, & Turner, 1986; Bell, Gleiber, Mercer, Hifer, Guinter, Cohen, Epstein, & Narayanan, 1989). The risk of repeated ear infections increases in one- to six-year-old children who attend child care in groups of more than six children (Hardy & Fowler, 1993).

The risk of hemophilus influenzas increases for children one year of age or older in a child care setting with four or more children, and the risk of infection peaks in settings with 21 or more children. Research indicates that group size should be limited to twice the maximum number of children allowed per adult. Smaller child care centers, not just those with smaller class sizes, have lower rates of disease. Outbreaks of Hepatitis A occur at the rate of 3% in centers that enroll less than 20 children but 53% in those that enroll 51 or more children (Hadler, Erben, Francis, Webster & Maynard, 1982). Children in small child care centers in France had two to three times the risk of repeated infections (e.g., upper respiratory tract infections, otitis media, conjunctivitis) than children in family child care settings with no more than three children (Collet, Burtin, Kramer, Bossard & Ducruet, 1994).

Lower child:staff ratios reduce the transmission of disease. Although there is little research available that examines the relationship between particular child:staff ratios and children's health (a major gap that needs to be addressed), the research that is available suggests that fewer children per adult reduces the transmission of disease because caregivers are better able to monitor and promote healthy practices and behaviors (Bredekamp, 1990; Hayes, Palmer, & Zaslow, 1990).

Safety

Smaller group size improves the caregiving behaviors of staff and the safety of children. The North Carolina Office of Child Care Licensing found that the severity and frequency of complaints (such as reports of severity and frequency of complaints or reports of abuse and neglect) were higher in child care centers serving 30 or more children (Russell & Clifford, 1987). Caregivers in small groups spend substantially more time interacting (praising, responding, comforting, questioning, and instructing) with children and are more actively involved with the children in their care (Ruopp, Travers, Glantz, & Coelen, 1979).

Lower child:staff ratios are associated with fewer situations involving potential danger (such children climbing on furniture (Hayes, Palmer & Zaslow, (1990); and child abuse (Howes, 1990). Having a second adult in a child care facility reduces the chances for child abuse (Howes, 1990). When centers and family child care homes have insufficient staff, caregivers are often burdened with the care of more children than they can manage, which increases their stress and makes it more likely that they will abuse the children (Deitch, 1987). Additional staff enables teachers to leave stressful situations until they are ready to cope with and respond to the children in a manner that does not inflict harm.

Mental Health/School Readiness

Research suggests that children in groups of 12-14 with two caregivers are more cooperative, compliant, and exhibit more reflection/innovation than children in groups of 24-28 with four caregivers. Children in smaller groups also exhibit more social competence than children in larger groups (Clarke-Stewart, Gruber, & Fitzgerald, 1994). Children become securely attached to individuals whom they trust to care for them in a responsive and sensitive manner. Caregivers with small groups are more actively involved

and spend more time interacting with children; they are more responsive, more socially stimulating, and less restrictive than caregivers in larger groups (NICHD Early Child Care Research Network, 1996). These behaviors correspond to those found in caregivers of securely attached children. Securely attached children tend to be more advanced in their play, less aggressive and withdrawn, and more socially competent than children who are insecurely attached (NICHD Early Child Care Research Network, 1996).

Children receive less attention, affection, responsiveness, and stimulation from caregivers each time a single child is added to a group (Clarke-Stewart, Gruber, & Fitzgerald, 1994). Caregivers have more positive, nurturing interactions with children and provide children with more individualized attention when they are in charge of smaller groups of children with smaller child:staff ratios (Dunn, 1993). Children who have highly involved caregivers tend to exhibit behaviors suggestive of secure attachment (e.g., they explore unfamiliar surroundings more, have more contact with the caregiver, and orient more to the caregiver than to a stranger) more than children with less involved caregivers (Anderson, Nagle, Roberts, & Smith, 1981).

Children who are members of larger groups and receive less individual attention show lower gains in PSI (Preschool Inventory) scores than children who are members of smaller groups and receive more individual attention. Children with higher language development scores tend to have caregivers who are more responsive, more sensitive, and less detached (Whitebook, Howes, & Phillips, 1989).

Smaller group size is associated with more developmentally appropriate classroom activities than larger group size. Groups of six or fewer infants, 12 or fewer toddlers, and 18 or fewer preschoolers are more likely to engage in developmentally appropriate activities than children in groups that exceed these numbers (Howes, Phillips, & Whitebook, 1992). When children are expected to perform at unattainable levels, they may feel overwhelmed and thus be less motivated to excel at academic pursuits (Eccles, Wigfield, & Schiefele, 1998).

Lower child:staff ratios are associated with less distress in toddlers, less apathy and distress in infants (Hayes, Palmer, & Zaslow, 1990), and greater social competence (Clarke-Stewart, Gruber, & Fitzgerald, 1994). Children in classrooms with lower child:staff ratios engage in more talk and play (Howes & Rubenstein, 1981) and display more gestural and vocal imitation (Francis & Self, 1982) than children in classrooms with higher child:staff ratios. Children who engage more frequently in conversations with caregivers tend to develop better socially (Clarke-Stewart, 1987).

Children in classrooms having lower child:staff ratios (i.e., 3:1 for infants, 4:1 for toddlers, 9:1 for preschoolers) are more likely to have positive interactions with caregivers, be properly supervised, and be engaged in activities rated as good or very good (NICHD Early Child Care Research Network, 1996; Howes, Phillips, Whitebook, 1992). Lower child:staff ratios relate to more developmentally appropriate caregiving and sensitivity (Whitebook, Howes, & Phillips, 1989); more contact (e.g., talking, playing, touching, and laughing) with children (Smith & Connolly, 1981); more responsive and stimulating behavior (NICHD Early Child Care Research Network, 1996); and less restriction of children's behavior (e.g., less commanding, correcting (Howes, 1983). Additional caregivers reduce the amount of irritability and restrictiveness that caregivers express to the children in their care (Rubenstein, Howes, & Pederson, 1982). Lower child:staff ratios are associated with higher rates of secure attachments between toddlers and their caregivers (Howes, Rodning, Galluzzo, & Myers, 1988).

Lower child:staff ratios are associated with more verbal communication between caregivers and children, which appears to foster language development in children. Adults and children talk to one another more when there is a lower child:staff ratio (Palmerus, 1996), and caregivers engage in more dialogues (i.e., verbal communications between a caregiver and child that involve an exchange of at

least three turns) and fewer monologues (i.e., verbal communications between a caregiver and child that contain only one or two sentences and involve only one or two turns (Palmerus, 1996)). More adult-child verbal interactions predict better scores on language inventories, whereas more peer verbal interactions predict lower scores on these measures (McCartney, 1984). Lower child:staff ratios allow caregivers to engage in more educational activities (e.g., teaching, promoting problem-solving) with children (Palmerus, 1991).

Summary Table:

Citation: NICHD Team (1999), Child outcomes when child care center classes meet recommended standards for quality, *American Journal of Public Health* , 89(7):1072-7.

Summary: This study assessed outcomes for children when child care centers meet recommended care standards. Data from the NICHD study of early child care were used to examine the association between meeting standards for child staff ratios, group sizes, caregiver training, and caregiver education and children's development at 24 and 36 months of age. There were five major findings: 1) most classes observed did not meet all four recommended standards; 2) linear associations were found between number of standards met and child outcomes, and this was more the case at 36 months than at 24 months of age; 3) there was no evidence of threshold effects; 4) children in classes that met more standards had better school readiness and language comprehension scores as well as fewer behavior problems at 36 months of age; 5) child outcomes were predicted by child staff ratio at 24 months and caregiver training and education at 36 months of age. Outcomes were better when children attended classes that met recommended child staff ratios and recommended levels of caregiver training and education.

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Citation: Moore (1996), Substitute child care at different ages: relationship to social emotional functioning in preschool, *American Journal of Orthopsychiatry*, 66(2):305-8.

Summary: In a pilot study based on parent and teacher ratings, the number of hours spent in substitute care during the first three years of life correlated with children's levels of behavior problems in preschool. The developmental period from 18 to 24 months was the most sensitive to the use of substitute care, and boys were more negatively affected than girls. The child adult ratio and setting were not significant factors. Results suggest reconsideration of parental leave policies and direction for future research.

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Citation: Deater-Deckard, Kinkerton, & Scarr (1996), Child care quality and children's behavioral adjustment: a four year longitudinal study, *Journal of Child Psychology & Psychiatry & Allied Disciplines* , 37(8):937-48.

Summary: Studies of extensive, full time child care in infancy and early childhood have shown negative, positive and no effects on children's social emotional development. The current study explored the prediction of children's behavioral adjustment four years after assessments of day care center quality and of the home and family environment. Participants included 141 school age children and their employed mothers who had made use of full time child care when the children were toddlers or preschoolers. Home environment factors and earlier behaviors were predictive of individual differences in adjustment four years later, particularly for maternal ratings of child behaviors. By contrast, indicators of center quality were generally unrelated to mother and teacher ratings of behavioral adjustment.

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Citation: Rosenthal & Vandell (1996), Quality of care at school aged child care programs: regulatable features, observed experiences, child perspectives, and parent perspectives, *Child Development*, 67 (5):2434-45.

Summary: This study investigates children's experiences at 30 school aged child care programs. Regulatable features such as total enrollment, child staff ratio, and staff education were assessed via director report. Observers recorded positive/neutral and negative interactions, and rated programs in terms of flexibility and age appropriateness. Negative staff child interactions were more frequent when child staff ratios were larger and when staff had less formal education. The presence of a greater number of different types of program activities was associated with staff having more frequent positive interactions with children and with observers rating programs as flexible and age appropriate.

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Citation: Burchinal, Roberts, Nabors, & Bryant (1996), Quality of center child care and infant cognitive and language development, *Child Development* , 67(2):606-20.

Summary: The relations between quality of center based child care and infant cognitive and language development were examined in a sample of 79 African-American 12 month old infants. Both structural and process measures of quality of child care were collected through interviews with the center director and observation of the infant classroom. Results indicated that quality of infant care positively correlated with scores on standardized assessments of cognitive development, language development, and communication skills. These findings, in conjunction with the growing child care literature, suggest that researchers and policymakers should focus on how quality of child care can be improved to enhance, not impair, infant development.

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Citation: Osguthorpe & Parsons (1995), Day care and the incidence of otitis media in young children, *Otolaryngology-Head and Neck Surgery*, 112(6):695-9.

Summary: This study assesses whether day care is a significant risk variable for otitis media in children younger than 2 years in the United States after controlling for the number of children in the day care group. After controlling for the total size of the day care group for children younger than 12 months, the previously established relationship between attending a day care center and frequent ear infections is reduced from an odds ratio of 3.17 to an odds ration of 1.34. The total size of the day care group is an important intervening variable in the relationship between attending day care and frequent ear infections for children younger than 12 months. The size of the day care group rather than the day care per se is the primary "modifiable risk variable" for many working parents.

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Citation: Laborde, Weigle, Weber, & Kotch (1993), Effect of fecal contamination on diarrheal illness rates in day care centers, *American Journal of Epidemiology*, 138(4):243-55.

Summary: Contact spread of enteropathogens in day care centers is supported by the recovery of fecal coliforms from hands and day care center formites. This prospective study was conducted to determine what, if any, quantitative measures of fecal coliforms predict the risk of diarrhea among day care center

attendees. Diarrheal illness without concomitant respiratory symptoms was monitored among 221 children under 3 years of age in 37 classrooms through biweekly parental telephone interviews from 10/88 to 5/89 in Cumberland County, North Carolina. This was the first study to demonstrate an increased risk of diarrhea associated with fecal contamination and the frequent sink contamination in day care centers.

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Citation: Howes & Whitebook (1992), Thresholds of quality: implications for the social development of children in center based child care, *Child Development* , 63(2):449-60.

Summary: The quality of center child care relationships with adults and peers for 414 children (ages 14 to 54 months) were assessed. Classrooms were classified by ratio and group size provisions of the FIDCR and by the ECERS and ITERS. Children cared for in classrooms meeting the FIDCR ratios were more likely to be in classrooms rated as good or very good in caregiving and activities. Children in classrooms rated as good or very good in caregiving were more likely to be securely attached to teachers. Securely attached children were more competent with peers. Children cared for in classrooms meeting FIDCR group size were more likely to be in classrooms rated higher in activities. Children in classrooms rated high in activities were likely to orient to both adults and peers. Children with social orientations to adults and peers were more competent with peers.

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Citation: Phillips, Howes, & Whitebook (1992), The social policy context of child care: effects on quality, *American Journal of Community Psychology* , 20(1):25-51.

Summary: Examined effects on the quality of children's child care environments of a) the stringency of state child care regulations; b) voluntary compliance with proposed federal child care standards; and c) the legal auspice of the center. Quality of care was assessed in 227 child care centers in five metropolitan areas. Centers in states with more stringent child care regulations tended to have better staff child ratios, staff with more child related training and lower staff turnover rates. Similarly, centers that more fully complied with the ratio, group size, and training provisions of a set of proposed federal child care standards had significantly lower staff turnover rates, more age appropriate classroom activities, less harsh and more sensitive teachers, and more teachers with specialized training. For profit centers offered children less optimal care than did nonprofit centers. These findings are placed in the context of ecological models of research and of contemporary policy debates about child care.

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Citation: Fiene (1997), Searching for a solution to the child care trilemma, *Child Care Information Exchange,* 117:57-60.

Summary: Describes the trilemma of inadequate quality, accessibility, and affordability of American child care. Proposes addressing the quality sector by utilizing a model which determines adult child ratios based upon quality of staff. Model argues the more highly qualified the program staff, the higher the quality of the overall program.

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Citation: Howes (1997), Children's experiences in center based child care as a function of teacher

background and adult child ratio, *Merrill-Palmer Quarterly*, 43(3):404-25.

Summary: Two studies examined impact of teacher background and teacher child ratio on child and teacher behavior in a child care environment. Both studies indicate more effective performances produced by teachers with higher degrees. One study suggests lower ratios are more effective. No interactive effect of ratio and background was noted.

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Citation: Kontos & Wilcox (1997), Teachers' interactions with children: why are they so important: research in review, *Young Children* , 52(2):4-12.

Summary: Reviews research demonstrating a positive relationship between children's quality interactions with teachers and their enhanced cognitive, socio-emotional, and language development. Discusses most frequently studied aspects of teacher behavior including roles, sensitivity/detachment, involvement and teacher talk. Describes influences on interactions including child characteristics, training, ratio, group size and curriculum. Summarizes implications for teachers, and lists recommended adult child ratios.

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Citation: Howes & Marx (1992), Raising questions about improving the quality of child care, *Early Childhood Research Quarterly* , 7(3):347-66.

Summary: Describes and contrasts aspects of child care systems in France and the US to stimulate discussion of child care standards. French child care is characterized by highly trained and reasonably compensated teachers who work in classrooms with class sizes and child adult ratios considered excessive by US standards.

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Citation: Howes et al. (1992), Thresholds of quality: implications for the social development of children in center based child care, *Child Development* , 63(2):449-60.

Summary: Examined thresholds for two aspects of child care: adult child ratio and group size. Investigated associations among different levels of these variables and with quality of care and children's social development. Findings suggest that meeting licensing standards for ratios and groups has a positive effect on ratings of the quality of care provided for children.

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Citation: Essa (1998), When, how and why child caregivers respond to children's behaviors, *Early Child Development and Care*, 141, 15-29.

Summary: Forty-two female child caregivers participated in one of six focus groups to examine how, when, and why they discipline young children. Aggressive behavior, not listening, and sexually related behaviors were the most likely behaviors to concern caregivers. These behaviors most frequently elicited the disciplinary strategies of time out, explanations, and redirection. How caregivers respond to misbehaviors was analyzed in terms of the attributions the caregivers make in regard to these misbehaviors. Age, gender, home, family, society, caregiver emotion, and child care setting

circumstances were the most frequently mentioned factors to affect caregiver discipline. Results also indicate that caregivers with higher levels of early childhood education and experience, and those working with smaller group and adult to child ratios provide more thoughtful answers that are more congruent with developmental appropriateness.

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Citation: McCartney, Scarr, Rocheleau, Phillips (1997), Teacher child interaction and child care auspices as predictors of social outcomes in infants, toddlers, and preschoolers, *Merrill Palmer Quarterly*, 43(3):426-450.

Summary: Examined 718 infants, toddlers and preschoolers who were enrolled in 120 child care centers from Massachusetts, Virginia, and Georgia to determine the effects of quality of care on children's social outcomes. Four auspices of child care centers were sampled: nonprofit, local for profit, national chains for profit, and church sponsored. Social outcomes included mothers' ratings of attachment, observations of social skills in classroom, and parents' rating of behavior problems. Quality of care assessment was based on teacher characteristics, teacher child ratio, and teacher child interactions. Results show that there were few associations between teacher child interaction and children's social outcomes. Higher work family interference was associated with poorer social outcomes generally. Children in nonprofit centers had better social outcomes on some measures.

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Citation: Palmerus (1996), Child caregiver ratios in day care center groups: impact on verbal interactions, *Early Childhood Development and Care* , 118, 45-57.

Summary: Explored the effect of caregiver child ratio on verbal interactions in six public day care center groups for preschool children in Sweden. Detailed records of verbal interactions were studied in one group where the number of children/caregiver had changed from 4.25 to 5.67. Caregivers were the main target for observation. Audio recorded verbal communications were coded and analyzed. Data were collected on three occasions in year 1 and on three occasions in year 2. With a high ration the proportion of child initiated verbal activities to the caregivers decreased, the proportion of adult initiated verbal activities increased, and the amount of verbal interaction between caregivers decreased.

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Citation: Scarr, Eisenberg, & Deater-Deckard (1994), Measurement of quality in child care centers, *Early Childhood Research Quarterly* , 9(2):131-151.

Summary: Assessment of quality of care in 363 classrooms with infants, toddlers, and preschool children was conducted in 120 child care centers in three states. Assessment measures included the ITERS, ECERS, and the Assessment Profile. Regulatable aspects of quality of child care included: ratio of caregivers to children, group size, teacher training in child development or child care, teacher education, highest wage paid to a center teacher, and staff turnover. Process measures proved to be highly redundant, both internally and with each other. Much smaller sets of items, drawn randomly from the instruments' item pools were found to be perfectly acceptable measure of quality. Regulatable measures did not prove to be acceptable measure of quality, except for teachers' wages, which were highly correlated with process measures of quality.

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Citation: Dunn (1993), Ratio and group size in day care programs, *Child & Youth Care Forum,* 22 (3):193-226.

Summary: Reviews literature on the influences of ratio and group size on children's development in day care. When measured separately, ratio and group size are sometimes, but not always related to children's development. When included as variables in quality clusters, ratio and group size are more likely to be related to developmental outcomes. Group size more consistently influences development in the expected direction than ratio. This suggests the need for increased attention to group size in the policy arena. Ratio and group size have been found to have both direct and indirect effects on development indicating that they are potentially valuable as proxy measures of children's experience in day care programs.

Additional Resources:

National Association for the Education of Young Children (NAEYC)
1509 16 th Street, NW
Washington DC 20036
1-800-424-2460
http://www.naeyc.org

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Staff (Director and Teachers) Qualifications Indicators

These two indicators overlap some with the next indicator that deals with training. Separating out state regulations that deal with these two indicators is difficult because qualifications and training form a continuum. Therefore, drawing a line between these indicators is generally arbitrary. Fifteen standards are related to this indicator and four standards are related to the training indicator.

CFOC Standards (1992):

ST 006: The director of a center enrolling fewer than 60 children shall be at least 21 years old and shall have an undergraduate degree in early childhood education, child development, social work, nursing, or other child related field, or a combination of college coursework and experience under qualified supervision. Education shall include a course in business administration or equivalent on the job training in an administrative position; a minimum of four courses in child development and early childhood education; and 2 years' experience as a teacher of children of the age group(s) in care.

ST 007: The director of a center enrolling 60 or more children shall be at least 21 years old and shall have an undergraduate degree in early childhood education, child development, social work, nursing, or other child related field, or a combination of college coursework and experience under qualified supervision. Education shall include one course in administration or at least 6 months' experience in administration, and 3 years' experience as a teacher of children of the age group(s) in care.

ST 008: Centers enrolling 30 or more children must employ a non-teaching director. Centers with fewer than 30 children may employ a director who teaches as well.

ST 009: In addition to the credentials listed in Appendix A, a director of a center or a small family child care home system enrolling 30 or more children shall provide documentation of one course or 26 to 30

clock hours of training in health and safety issues for out of home facilities, in addition to other educational qualifications, upon employment. This training requirement shall be reduced to a minimum of 17 clock hours for directors of facilities caring for fewer than 30 children. This training shall include at least the following content:

a. Mechanisms of communicable disease spread.
b. Procedures for preventing the spread of communicable disease, including handwashing, sanitation, diaper changing, health department notification of reportable disease, equipment, toy selection and proper washing, disinfecting to reduce disease and injury risk, and health related aspects of pets in the facility.
c. Immunization requirements for children and staff.
d. Common childhood illnesses and their management, including child care exclusion policies.
e. Organization of the facility to reduce illness and injury risks.
f. Training child care staff and children in infection and injury control.
g. Emergency procedures.
h. Promotion of health in the child care setting.

ST 010: In addition to the general requirements in Qualifications of Directors of Centers, the director of a facility for children under 5 years of age shall have not less than 2 to 3 years of experience, depending on the size of the center, as a teacher of infants, toddlers, and preschoolers. Directors of facilities for children ages 0 to 35 months shall have their 2 to 3 years of experience with infants and toddlers. Directors of facilities for children ages 3 to 5 years shall have their 2 to 3 years of experience with preschoolers.

ST 011: In addition to the general requirements in Qualifications of Directors of Centers, the director of a school-age child care facility shall hold an undergraduate degree in early childhood education, elementary education, child development, recreation, or other child related field, or a combination of college coursework and experience under qualified supervision, and not less than 2 years' experience working with school-age children.

ST 034: Directors and large family home caregivers shall check references and examine employment history before employing any staff, including substitutes, who will be alone with a child or a group of children in child care.

ST 012: Caregivers shall have knowledge of child development and early childhood education; an undergraduate degree in early childhood education, child development, social work, nursing, or other child related field, or a combination of experience under qualified supervision and college coursework; 1 year's experience (or the equivalent as specified in Appendix A); and on the job training to provide a nurturing environment and to meet the child's out of home needs.

ST 013: Centers shall employ licensed, certified teaching, caregiving staff for direct work with children in a progression of roles such as the following:

a. aides,
b. assistant teachers,
c. associate teachers,
d. teachers,
e. lead teachers, and;
f. education coordinators; Each role with increased responsibility shall have increased educational qualifications as outlined in Appendix A.

ST 014: Every center, regardless of setting, shall have at least one licensed/certified lead teacher (or mentor teacher) who has a Bachelor of Arts, Bachelor of Science, Bachelor of Education, or Master of Education degree in early childhood education, child development, social work, nursing, or other child-related field, in addition to at least 1 year of experience working in child care serving this age group. All teachers in charge of a group shall be licensed/certified as lead teachers, teachers, or associate teachers, with education and experience related to the care and development of infants and toddlers, as well as supervised experience with this age group.

ST 015: Caregivers shall want to work with infants and toddlers when asked and shall know what the job entails-fostering interaction, diapering, bathing, feeding, holding, comforting, and responding.

ST 016: Every center, regardless of setting, shall have at least one licensed/certified lead teacher (or mentor teacher) who has a Bachelor of Arts, Bachelor of Science, Bachelor of Education, or Master of Education degree in early childhood education, child development, social work, nursing, or other child-related field, as well as at least 1 year of experience working in child care with this age group. All teachers in charge of a group shall be licensed/certified as lead teachers, teachers, or associate teachers, with education in child development and early childhood education specific to this age group, as well as supervised experience with preschool children.

ST 017: Caregivers shall demonstrate an ability to apply their understanding of the developmental characteristics of 3- to 5-year-olds. Caregivers shall demonstrate knowledge and understanding of these children's independence and social competence, more complex inner lives, and increasing ability to adapt to their environment and cope with stress.

ST 018: Every center, regardless of setting, shall have at least one licensed/certified group leader (or mentor teacher) who has a Bachelor of Arts, Bachelor of Science, Bachelor of Education, or Master of Arts degree in child development or early childhood education covering ages newborn to 8 or 3 to 8, elementary education, recreation, or a related field, as well as at least 1 year of experience working in child care. Teachers in charge of a group shall be licensed/certified as lead teacher, teacher, or associate teacher with education in child development and programming specific to this age group; they shall also have supervised experience with school-age children. Caregivers shall have training and supervised experiences in child development and education.

ST 019: Caregivers shall demonstrate knowledge about the social and emotional needs and developmental tasks of 5- to 12-year-old children, and shall know how to implement a nonacademic, enriching program.

Research Review/Gap Analysis:

Caregivers should be encouraged or required to have as much general education and/or specific training in child development, health, and safety as possible because educated and trained caregivers are more likely to promote the physical and mental health, safety, and cognitive development of the children in their care. Child care directors who have more experience and education are more likely to appropriately monitor staff, which promotes children’s health. Higher rates of diarrhea have been found in child care centers where the directors had less than eight years of experience (Soto, Guy, Deshaies, Durand, Gratton & Belanger, 1994). Caregivers are more likely to exhibit behaviors that protect children’s health and safety if their behavior is monitored (Black et al., 1981). Staff surveillance requires knowledge of behaviors that reduce the transmission of disease; this suggests that child care directors should have as much or more education in child development and health than the direct caregivers they supervise.

Caregivers with a bachelor's degree with or without specialized training or with no bachelor's degree but with specialized training at the college level behave more sensitively and less harshly, engage in more positive interactions (more warmth, more enthusiasm, and more developmentally appropriate communication with children) and display less detachment (more involved with and interested in the children) and less punitiveness (less hostile, threatening, and harshly critical of children) (Arnett, 1989; Whitebook, Howes, & Phillips, 1989).

Caregivers with more education have children who are more compliant and socially competent (Clarke-Stewart, Gruber, & Fitzgerald, 1994). College-educated caregivers encourage children more, exhibit more teacher direction (developing goals for children without pressuring the children to accept them), and engage in less restrictive behavior with children than do high-school-educated caregivers (Berk, 1985). Caregivers who complete at least two child-related courses at the community college level hold less authoritarian attitudes (like strict rules, little give-and-take about rules, assertive discipline strategies, and emphasis on conformity) than those who have no training at all (Arnett, 1989). Such attitudes toward caregiving appear to influence the behavior exhibited by caregivers (Holden, 1995). The promotion of independence contributes to the development of social competence and school readiness in children.

Caregivers with more education are more likely to continue in child care employment (Berk, 1985), which promotes attachment and social development in children. Caregivers who plan to continue in child care employment are less restrictive, place a greater emphasis on the development of children's verbal skills, and have better child-oriented attitudes than those who do not plan to continue working in child care. Children who have stable caregivers are more likely to engage in social activities, spend less time aimlessly wandering around the center (Whitebook, Howes, & Phillips, 1989), and are more likely to display secure attachments (Hayes, Palmer, & Zaslow, 1990), which is a major component of later healthy personal/social development.

Caregivers with college educations tend to engage children in interactions that expand upon and extend children's ongoing activities and promote the development of verbal skills (Berk, 1985). College-educated caregivers are almost three times as likely to display behaviors that promote the development of verbal skills (such as encouraging children to express themselves verbally, explaining the meaning of words, giving factual information) than caregivers with only a high school diploma (Berk, 1985). Children who have caregivers who answer their questions, engage them in more informative talk, and give information to and request information from them have higher language competence and intelligence test scores (McCartney, 1984).

Children tend score higher on the Preschool Inventory (a measure of children's knowledge of shapes, sizes, parts of the body, spatial relationships, etc.) and other measures of intellectual ability (like language comprehension, verbal fluency, memory, object recognition, and knowledge of concepts) when they are cared for by caregivers with more years of education (Clarke-Stewart & Gruber, 1984).

Summary Table:

Citation: Bloom (1997), Navigating the rapids: directors reflect on their careers and professional development, *Young Children* , 52(7):32-38.

Summary: In an effort to address issues concerning credentialing early childhood directors, explores career decisions and provides a framework for understanding the growth and development of director competence through the career cycle. The career cycles of beginning, competent, and master directors, and the growth and change which occur, are detailed.

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Citation: Phillipsen, Burchinal, Howes, & Cryer (1997), The prediction of process quality from structural features of child care, *Early Childhood Research Quarterly*, 12(3):281-303.

Summary: This study examined the structure of child care classrooms and centers to predict process quality. Costs and quality of early childhood center based care in four states with varying levels of regulation were analyzed to identify characteristics of the teacher, classroom, director, and center related to child care quality.

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Citation: Galinsky, O'Donnell, Sazer, & Boose (1996), *Florida child care quality improvement study* .

Summary: The ongoing Florida child care quality improvement study investigates how Florida's new ratios and education requirements for early education and care affect children's development, parents' lives, and the early childhood marketplace. The project consists of three interrelated studies: the children's study, the parent study and the market study. The report summarizes the findings of all three studies in 1992 and 1994, and reports new findings from the 1996 children study. Among the findings noted are the following: 1) increased teacher education and ratio requirements significantly contributed to a number of positive outcomes in children's development in 1994 and continue to improve in 1996; 2) in comparison with other national multi-site studies of the overall quality of early education and care, Florida has made positive strides; 3) increased staff education and more rigorous ratio requirements did not have a marked negative impact on the child care marketplace nor did requirements significantly affect consumer costs during the 1992-96 period; 4) the greatest gains in children's development and in the quality of the early childhood education and care occurred when classrooms met professionally recommended ratios, which are higher then the new Florida ratios; and 5) teachers with an advanced education had the highest scores in terms of children's development and classroom quality; however, in 1996, teachers with a CDA or equivalency were warmer and more sensitive as well as more responsive with children than those with less than a CDA.

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Citation: Howes (1997), Children's experiences in center based child care as a function of teacher background and adult child ratio, *Merrill-Palmer Quarterly*, 43(3):404-25.

Summary: Two studies examined impact of teacher background and teacher child ratio on child and teacher behavior in a child care environment. Both studies indicate more effective performances produced by teachers with higher degrees. One study suggests lower ratios are more effective. No interactive effect of ratio and background was noted.

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Citation: Rodd (1997), The selection and preparation of early childhood teachers: perceptions of employers and teachers, *Early Child Development & Care*, 130, 99-110.

Summary: Studied perceptions of early childhood teachers and employers regarding early childhood teacher education. Found that previous experience with, attitudes toward, and understanding of children and entry qualifications were weighted higher than age and gender for teacher selection.

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Citation: Kagan & Neuman (1997), Highlights of the quality 2000 initiative, *Young Children,* 52(6):54-62.

Summary: Describes the quality 2000 advancing early care and education initiative–the purpose is to address the quality crisis in early childhood education. Details eight areas of improvement and recommendations: quality, results, family engagement, staff credentialing, staff training, licensing, funding, and governance structures.

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Citation: Snow et al. (1996), Child care center licensing standards in the United States, *Young Children* , 51(6):36-41.

Summary: Studied child care quality indicators via a comparison of state child care licensing requirements in three areas: child staff ratio, group size, and caregiver educational requirements. Compared these data to 1981 data to assess changes in licensing regulations. Found both positive and negative changes and that regulations vary greatly state by state.

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Citation: Honig (1996), Early childhood education, training for the future, *Early Child Development & Care,* 121, 135-45.

Summary: Discusses the future training of early childhood educators, focusing on techniques for teachers to build prosocial skills, develop aesthetic appreciation, inculcate acceptance and inclusion, and develop a curiosity for learning among children.

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Citation: Lowenthal (1995), Competencies of the early childhood special educator in the United States, *Early Child Development and Care* , 113, 59-64.

Summary: Discusses the kinds of competencies needed by educators to better assist young children with disabilities and their families. These competencies include: knowledge of early childhood as a distinct phase of development, experiences in working with families, skills in collaboration and coordination, developmentally appropriate intervention, and delivery of services in inclusive settings.

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Citation: Bredekamp (1995), What do early childhood professionals need to know and be able to do?, *Young Children*, 50(2):67-69.

Summary: Describes the purpose and history of guidelines posed by NAEYC for teacher education in BA and advanced degree programs. Summarizes the result of the review processes, describing how the new curriculum guidelines differ from the earlier versions and how the guidelines can be used to shape programs and to influence policy.

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Citation: Morgan et al. (1993*), Making a career of it: the state of the states report on career development in early care and education* .

Summary: Noting that 11 million children are involved in early care and education outside their homes, and that the quality of the services these children receive depends on the knowledge and skills of the people who care for and teach them, this report presents the results of the first national study of career development in early care and education. It examines regulations, training opportunities, and financial support that shape the preparation of center and home based practitioners. The study revealed the lack of a coordinated system to develop well trained practitioners to work with young children in homes, centers, Head Start programs, or schools. Millions of practitioners are not required to have early childhood training. Training that develops the full range of essential early care and education knowledge and skills is not consistently available or accessible.

Additional Resources:

The Center for Career Development in Early Care and Education
Wheelock College
200 The Riverway
Boston, MA 02215
617-734-5200 x2211
http://ericps.ed.uiuc.edu/ccdece/ccdece.html

Center for the Child Care Workforce (CCW)
733 15th Street, NW Suite 1037 Washington, DC 20005-2112
Phone: 1-800-879-6784
Fax: 202-737-0370
E-mail: ccw@ccw.org
http://www.ccw.org/

National Association for the Education of Young Children (NAEYC)
1509 16th Street, NW
Washington DC 20036
1-800-424-2460
http://www.naeyc.org

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Staff Training Indicator

This indicator overlaps with the previous indicators that deal with training. Separating out state regulations that deal with this indicator is difficult because qualifications and training form a continuum. Therefore, drawing a line between these indicators is generally arbitrary. A great deal of variability in this indicator is exhibited when state-to-state regulations are compared. These 11 standards encompass the essence of the regulatory citations.

CFOC Standards (1992):

ST 039: Caregivers shall be educationally qualified in advance for the role they are entering and shall receive orientation training during the week immediately following employment. Caregivers shall also

receive continuing education each year. In centers, directors shall ensure that 12 hours of staff meetings are held, in addition to the continuing education specified in Continuing Education.

ST 040: All new full-and part-time staff shall be oriented to, and demonstrate knowledge of, the following items a through o. The director of any center or large family-child-care home shall provide this training to newly hired caregivers. Small family home caregivers shall avail themselves of orientation training offered by the licensing agency, a resource and referral agency, or other such agency. This training shall include evaluation and a repeat demonstration of the training lesson. The orientation shall address, at a minimum:

a. The goals and philosophy of the facility.
b. The names and ages of the children for whom the caregiver will be responsible, and their specific developmental needs.
c. Any special adaptation(s) of the facility required for a child with special needs.
d. Any special health or nutrition need(s) of the children assigned to the caregiver.
e. The planned program of activities at the facility.
f. Routines and transitions.
g. Acceptable methods of discipline.
h. Policies of the facility about relating to parents.
i. Meal patterns and food-handling policies of the facility.
j. Occupational health hazards for caregivers.
k. Emergency health and safety procedures.
l. General health policies and procedures, including but not limited to the following:
    1. Handwashing techniques, including indications for handwashing.
    2. Diapering technique and toileting, if care is provided to children in diapers and/or needing help with toileting, including appropriate diaper disposal and diaper-changing techniques.
    3. Correct food preparation, serving, and storage techniques if employee prepares food.
    4. Formula preparation, if formula is handled.
m. Child abuse detection, prevention, and reporting.
n. Teaching health promotion concepts to children and parents as part of the daily care provided to children.
o. Recognizing symptoms of illness.

ST 041: Orientation training in centers shall be documented. The director shall document the topics covered and the dates on which the orientation was provided.

ST 042: During the first three months of employment, the center director or large family home caregiver shall document, for all full-time and part-time staff, additional orientation in and the employee's satisfactory knowledge of the following topics for the purpose of noting and responding to illness in the facility. Staff shall not be assigned to tasks involving these topic areas before receiving the orientation training.

a. Recognition of symptoms of illness and correct documentation procedures for recording illness symptoms.
b. Exclusion and readmission procedures.
c. Cleaning, sanitation, and disinfection procedures.
d. Procedures for administering medication to children and for documenting medication administered to children.
e. Procedures for notifying parents or legal guardians of communicable disease occurring in children or staff within the facility.
f. Procedures for performing the daily health assessment of children to determine whether they are

ill and whether they need to be excluded from the facility.

ST 043: Staff members shall not be expected to take responsibility for any aspect of care for which they have not been oriented and trained.

ST 044: The director of a center or a large family-child-care home shall ensure that all staff involved in the provision of direct care are certified in pediatric first aid that includes rescue breathing and first aid for choking. At least one certified staff person shall be in attendance at all times and in all places that children are in care.

ST 045: Small family home caregivers should be certified in pediatric first aid training that includes rescue breathing and first aid for choking.

ST 046: Pediatric first aid training, including rescue breathing and first aid for choking, shall be consistent with pediatric first aid training developed by the American Red Cross, the American Heart Association, or the National Safety Council for First Aid Training Institute, or the equivalent of one of the three. The offered first aid instruction shall include, but not be limited to, the emergency management of:

a. Bleeding.
b. Burns.
c. Poisoning.
d. Choking.
e. Injuries, including insect, animal, and human bites.
f. Shock.
g. Convulsions or nonconvulsive seizures.
h. Musculoskeletal injury (e.g., sprains, fractures).
i. Dental emergencies.
j. Head injuries.
k. Allergic reactions.
l. Eye injuries.
m. Loss of consciousness.
n. Electric shock.
o. Drowning.

ST 047: Facilities that have a swimming pool or built-in wading pool shall require infant and child CPR training for caregivers. At least one of the caregivers, volunteers, and other adults who are counted in the child:staff ratio for wading and swimming (see standard ST4, p. 3) shall be trained in basic water safety and certified in infant and child CPR each year by a person certified as an instructor in water safety and in CPR. (For small family-child-care homes, the person trained in water safety and CPR shall be the caregiver.) Written verification of CPR and lifesaving certification, water safety instructions, and emergency procedures shall be kept on file.

ST 048: Facilities that serve children with special needs shall have at least one caregiver certified in infant and child CPR. Written verification of CPR certification shall be kept on file.

ST 049: Records of current certification of pediatric first aid including rescue breathing and first aid for choking (and infant and child CPR, when indicated) shall be maintained in the files of the facility.

ST 050: Directors and all caregivers shall have at least 30 clock hours per year of continuing education

in the first year of employment, 16 clock hours of which shall be in child development programming and 14 of which shall be in child health, safety, and staff health; and 24 clock hours of continuing education based on individual competency needs each year thereafter, 16 of which shall be in child development programming and 8 of which shall be in child health, safety, and staff health.

Research Review/Gap Analysis:

Staff training in procedures meant to reduce the transmission of infectious disease reduces the number of pathogens present in child care (Bartlett, et al., 1988), including the number of intestinal illnesses (Butz, Larson, Fosarelli & Yolken, 1990), the number of cases of diarrhea (Soto, Guy, & Belanger, 1994), the number of upper respiratory infections (Gillis, Holaday, Lewis & Pantell, 1989), and the frequency of illness symptoms (Ulione & Donovan, 1996; Ulione, 1997). After receiving training in hand washing, those who earned the best scores for hand washing had children with lower rates of diarrhea. Further, implementing a health education program reduced the incidence of diarrhea (from 72.7 to 20.4 cases per 100 child-years) and colds (from 208.7 to 94.5 cases (Soto, Guy, Deshaies, Durand, Gratton, & Belanger, 1994). After participating in training to reduce the transmission of infectious diarrhea, 41 of 44 caregivers passed an examination of the procedures they had just been taught. Eight months later, 28 of the 44 originally trained workers and 14 subsequently trained workers were given the same examination. None of the caregivers passed the examination (Bartlett, Jarvis, Katz, Dalia, Englender, & Anderson, 1988). One might infer that caregivers did not practice the behaviors they initially learned. Conversely, instituting a hand washing program for caregivers and following it up with continuous monitoring of caregivers' hand washing practices was associated with a 50% decrease in the incidence of diarrhea in two child care centers (Morrow, Townsend, & Pickering, 1991). Monitoring appears to remind staff of their training and promotes implementation of healthy practices.

Staff training programs reduce the number of accidental injuries in child care centers (Ulione, 1997). Significant decreases in the number of accidental injuries occur after child care staff have been trained in identifying signs and symptoms of childhood illnesses and infection control, preventing child and staff injuries, and providing basic first aid for children (Ulione, 1997). Staff training programs may be more effective when accompanied by staff monitoring. Two years after receiving an intervention that taught child care directors about the specific hazards found on their playgrounds, explained why these problems were dangerous, and distributed educational materials about child safety, inspectors returned to the centers and found that the intervention playgrounds were no less hazardous than centers that did not receive the intervention (Sacks, Brantley, Homgreen, & Rochat, 1992). The intervention might have been more effective if it had been accompanied by monitoring.

Caregivers who receive specialized training are better able to facilitate a positive learning and socialization environment, and tend to have children who are more compliant, more cooperative, less aggressive, and who exhibit fewer negative (i.e., uncooperative, unpleasant, and avoidant) behaviors with an unfamiliar peer in a laboratory playroom (Clarke-Stewart, Gruber, & Fitzgerald, 1994; Kontos, Hsu, & Dunn, 1994). Caregivers with more training tend to stimulate children's cognitive and language development and have children with higher cognitive competence who display more complex cognitive play (Kontos, Hsu, & Dunn, 1994). When caregivers receive specialized training in facilitating language interactions, such interactions increase in frequency, which result in children's accelerated language acquisition (Tennant, McNaughton, & Glynn, 1988).

The American Public Health Association and American Academy of Pediatrics in *Caring for Our Children* suggest that child care directors and caregivers should have at least 30 hours per year of continuing education in their first year of employment (16 hours in child development and 14 in safety, child health, and staff health). Each year thereafter, directors and staff should obtain 24 hours of training

(16 in child development and eight in health). New staff should receive an orientation to the policies and procedures (including children's needs, discipline, relating to parents, emergency procedures, basic hygiene practices, and child abuse) of the center. Within the first three months, they should also receive training in infection control procedures and daily health assessments.

Caregivers should receive training on sanitary procedures, the early assessment of certain illnesses, child development and developmental disabilities, general first aid, rescue breathing, and first aid choking (Lie, Runyan, Petridou, & Chang, 1994). Training should include sanitary procedures that reduce the spread of disease (e.g., staff and child hand washing, food preparation and service), which have been shown to reduce diarrheal illnesses. Three out of four child care centers report a need for more information on infectious diseases (O'Mara & Chambers, 1994). First aid training should be consistent with that of the American Red Cross, the American Heart Association, or the National Safety Council. It should be more child-focused than standard first aid courses (Lie, Runyan, Petridou, & Chang, 1994). Child care center staff should be trained to detect developmental disabilities and to make referrals for appropriate intervention (Parrino & Thacker, 1994).

Child care directors and staff should be trained to assess children's daily health. Training in daily health assessments should include detection of signs and symptoms of common childhood diseases. If childhood professionals are trained to observe the signs and symptoms of various childhood diseases, they may be better able to enable infected children to seek professional medical help earlier and to limit the transmission of infectious disease (Morgan, Stevenson, Fiene, & Stephens, 1986).

Training programs should be practical and cumulative in nature (Kendrick, 1994) and should be structured to promote the acquisition and retention of information. Coherent, cumulative training programs appear to be more effective than single sessions that do not build upon one another (Copple, 1991). The most preferred forms of training are those that actively involve students in learning, such as small group discussions, demonstrations and modeling, role playing, games and simulation, observations of actual procedures, and video presentations (Kendrick, 1994). A mentoring model appears to be most effective. Changes in caregivers' behavior are most often seen when the content of training is focused and meets a specific need, when handouts are disseminated for later reference, when the administration supports the training, and when a variety of training techniques are used. In contrast, caregivers may not learn much from training that consists of charts, research data, and foreign terminology. Changes in caregivers' behavior are not as likely to be seen following training that is based on work sheets, panel discussion, and homework assignments.

Effective training conveys information in the same context in which caregivers work every day. Trainers must speak in the same language and be able to understand the day-to-day dilemmas faced by child care providers. Nurses are effective trainers of health and safety practices in child care centers (Peterson-Sweeney & Stevens, 1992; Ulione, 1997; Ulione & Donovan, 1996). Some professionals suggest that schools of nursing contract with child care centers to have nursing students gain clinical experience through implementing training programs for child care providers (Ulione, 1997).

An area for additional research involves the assessment of how staff monitor their own health care needs. This is critical given the lack of proper health care coverage for the majority of staff employed in child care. Training or mentoring programs and monitoring systems might be important additions in order to find out how this potentially very vulnerable group of individuals is dealing with their health needs. The accessibility and adequacy of child care training is an area that needs to be addressed in the research literature. Acknowledging the importance of staff training in these particular areas is one thing, but providing easy access to these trainings so that they are truly available and affordable is another issue.

Summary Table:

Citation: Cassidy, Hicks, Hall, & Farran (1998), The North Carolina child care corps: the role of national service in child care, *Early Childhood Research Quarterly*, 13(4):589-602.

Summary: Evaluated the impact of training and experience on the knowledge, beliefs, and practices of AmeriCorps child care volunteers in North Carolina. Found that Corps members completed successful training, but, after nine months of service, showed a decline in the appropriateness of their interactions with children.

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Citation: Honig & Hirallal (1998), Which counts more for excellence in child care staff—years in service, education level or early childhood education coursework?, *Early Child Development & Care*, 145, 31-46.

Summary: Observed 81 caregivers from 24 urban centers interacting with 3 and 5 year olds. Interactions were categorized into negative/positive, language facilitation, concept promotion, and care giving and cleaning up domains. When all positive teacher interactions were combined, found that early childhood education/child development course work accounted for over 62% of variance in teacher inputs.

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Citation: Espinosa, Busch, Patterson (1998), Evaluation of an in-service model to train child care providers about inclusion, *Journal of Research in Childhood Education*, 12(2):130-42.

Summary: Home and center based child caregivers were randomly assigned to training and control groups. Caregivers who received training on inclusion attended group meetings and observed either live, or videotaped, on-site demonstrations. Caregivers who received training scored significantly higher on an observation scale and self-rating questionnaire than control caregivers, but there were no significant differences between video versus live training presentations.

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Citation: Miller & Stayton (1998), Blended interdisciplinary teacher preparation in early education and intervention, *Topics in Early Childhood Special Education*, 18(1):49-58.

Summary: A survey of 41 faculty explored interdisciplinary teacher preparation programs that blend personnel standards from early childhood special education and early childhood education. The benefits and barriers to interdisciplinary, blended programs are discussed, along with the many concerns among faculty who are members of interdisciplinary teams in these programs.

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Citation: Sumsion (1997), Early childhood teacher education programs, *Early Child Development and Care*, 129, 129-41.

Summary: This study addressed whether early childhood teacher education programs can effectively prepare graduates to work with children across the entire 0-8 years age span. Data from the students' practicum suggested that generalist programs can offer effective preparation for entry into the early

childhood teaching profession.

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Citation: Bloom (1996), The quality of work life in NAEYC accredited and non accredited early childhood programs, *Early Education & Development* , 7(4):301-7.

Summary: Compared work environments of NAEYC accredited and non accredited centers using the early childhood work environment survey. Found that innovativeness, goal consensus, opportunities for professional growth, and clarity accounted for the greatest differences between accredited and non accredited centers. Also found differences in staff's commitment, turnover, and teacher's current and desired levels of decision making influence.

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Citation: Davis et al. (1996), Training determinants for quality infant child care, *Early Child Development and Care,* 124, 25-32.

Summary: Examined the associations among infant caregivers' training and the quality of care they provide. Found through observation and rating of 50 caregivers that as infant caregiver training levels increased, so did mean scores on some dimensions of quality, such as personal care routines and learning activities.

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Citation: Haskell (1992), *Using training as a means to improve the level of quality in child care facilities* .

Summary: This practicum as designed to increase the quality of service in five day care centers in a metropolitan Florida county, as evidence by increase in the ECERS scores of early childhood teacher participants. A ten week teacher education program for five early childhood teachers was developed. Pre- and post-intervention ECERS scores were developed by observing the participants in their day care center classrooms. All five participants made significant improvements in their ECERS scores, especially in the areas of furnishings/displays and creative activities.

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Citation: Galinsky et al. (1995), *The family child care training study, Families and Work Institute* .

Summary: The family work institute conducted a study in San Francisco Valley, California; Dallas, Texas; and Charlotte, North Carolina, to examine the effects of child care aware's family to family training program on 130 child care providers. These providers were compared to 112 regulated providers not participating in family to family training. Results show that 1) after training, children behaved in ways demonstrating that they are more securely attached to their providers; 2) training improved the overall quality scores of sites; 3) after training, 97% of providers reported increased their commitment to their jobs and began to seek out additional training; and 4) providers increased their involvement in family child care associations, the family child care community, and the child and adult care food program. Recommendations include the following: 1) increase provide and public investment in child care; 2) develop beginning, intermediate, and advanced family child care training; and 3) develop strategies for improving the quality of nonregulated providers.

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Citation: Whitebook et al. (1995), *Mentoring in early care and education* , National Center for the Early Childhood Work Force.

Summary: This report describes the nature of the mentoring relationship between mentors and protégés, the goals common to all mentoring programs, and some general principles that can serve to guide program development. The successes and barriers faced by seven mentoring programs are presented. Successes are related to the ability to provide relevant training to committed teachers and providers, and the chance to recognize mentors' skills and commitment. Obstacles are centered around the availability of and access to resources. The last part of the report cites the need for a national early childhood mentoring alliance, resource materials for mentoring programs, a program developers' network, and a mentor network.

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Citation: Fiene (1993), *Pennsylvania early childhood/child care training system model* , EDRS ED350080 .

Summary: A multi-dimensional training program is being implemented in Pennsylvania to improve the quality of early childhood and child care programs. Training opportunities are provided for early childhood program and day care center staff, group and family home day care providers, and unregulated child care providers. The overall training plan is designed to offer a variety of training options and topics so staff can choose those most closely suited to their level of knowledge and experience. Training covers developmentally appropriate practice; health and safety; separation and loss; emergent literacy; intergenerational programming; observation and evaluation skills; administration of early childhood and child care programs; children's literature; use of community resources; working with parents; discipline; growth-promoting relationships; and interpersonal skills.

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Citation: Krajicek & Moore (1993), Child Care for Infants and Toddlers with Disabilities and Chronic Illnesses, *Focus on Exceptional Children* .(25)8:1-16.

Summary: This paper discusses the need for child care for infants and toddlers with disabilities and chronic illnesses; types of child care; shortage of and need for specially trained caregivers; influence of federal programs; the importance of family involvement; and a program providing preservice training to caregivers in public and private child care facilities, called First Start.

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Citation: Shirah et al. (1993), Preservice Training Fosters Retention: The Case for Vocational Training, *Young Children*, (48)4:27-31.

Summary: The lack of adequate training contributes to a high turnover rate among child care employees. A training program developed by the University of South Alabama reduced turnover in the Mobile, Alabama, area. Among caregivers who received training, 68% were still employed in the field one year after graduation.

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Citation: Palmerus, & Pramling (1995), *Increasing the Competence of Staff Dealing with Young Children* .

Summary: This paper reports on a study designed to increase the psychological and educational knowledge of day care staff and develop content and methods appropriate for toddlers in day care settings. Preschool teachers and nursery nurses in three day care centers participated. They were interviewed at the beginning of the study, and 19 months later at the study's end. The interviews dealt with their experience of working with toddlers, expectations for the project, knowledge of child development, work as caregivers and educators, and attitudes toward work. At the beginning of the study, subjects attended a one-week course that covered theories and knowledge about child development and information about the Swedish preschool program. Mediated Learning Experiences (MLE), an intervention program based on adult mediation between the child's experiences and the surrounding environment, was implemented. Every four weeks, interactions between children and staff were videotaped and analyzed. Results indicated that MLE, and the teaching and guidance of the staff, increased the staff's capacity to interact in a stimulating way with children. The interviews indicated changes in staff attitudes about the education of toddlers. Viewings of the videotapes enabled staff members to understand their own behavior and increased their ability to individualize and to take the viewpoint of the toddler.

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Citation: Eggbeer & Pratt, Establishing statewide systems of inservice training for infant and family personnel, *Infants & Young Children*, 5(3):49-56.

Summary: In accordance with Part H of the Individuals with Disabilities Education Act (IDEA), states are required to ensure that all professionals and paraprofessionals serving infants, toddlers, and their families are adequately trained. This article discusses the experience of two states -- Massachusetts and Hawaii -- in establishing statewide, inservice training programs for personnel serving children under the age of 3 years and their families. It also relates their efforts to the work of ZERO TO THREE/National Center for Clinical Infant Program's (NCCIP) Training Approaches for Skills and Knowledge (TASK) project, in which professionals from both states participated.

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Citation: Peisner-Feinberg, & Burchinal (1997), Relations between preschool children's child-care experiences and concurrent development: The Cost, Quality, and Outcomes Study, *Merrill-Palmer Quarterly*, 43(3):451-477.

Summary: As part of the Cost, Quality, and Outcomes Study, child and family characteristics were tested to see whether they moderated the relation between center-based child care quality and preschool children's concurrent cognitive and socioemotional development. Analyses included a multisite sample of 170 child-care centers of varying quality and 757 children (mean age 4.3 yrs). Results provide further evidence that there is a positive relation between child-care quality (both observed classroom practices and teacher ratings of teacher-child closeness) and children's cognitive and socioemotional outcomes. Moderating influences of family characteristics were observed for some outcomes, indicating stronger positive effects of child-care quality for children from more at-risk backgrounds. Further, there was no evidence that children from more advantaged families were buffered from the effects of poor-quality care.

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Citation: McCartney, et al. (1997), Teacher-child interaction and child-care auspices as predictors of social outcomes in infants, toddlers, and preschoolers, *Merrill-Palmer Quarterly*, 43(3):426-450.

Summary: Examined 718 infants (aged 11-17.9 mo), toddlers (aged 18-35.9 mo), and preschoolers (aged 36-61.7 mo), who were enrolled in 120 child-care centers from Massachusetts, Virginia, and Georgia, to determine the effects of quality of care on children's social outcomes. Four auspices of child-care centers were sampled: nonprofit, local for-profit, national chains for-profit, and church-sponsored. Social outcomes included mothers' ratings of attachment, observations of social skills in classroom, and parents' rating of behavior problems. Quality of care assessment was based on teacher characteristics, teacher:child ratio, and teacher-child interactions. In addition, child developmental patterns and family characteristics, such as work-family interference and family stress, were tested. Results show that there were few associations between teacher-child interaction and children's social outcomes. Higher work-family interference was associated with poorer social outcomes generally. Children in nonprofit centers had better social outcomes on some measures, although effects were small.

Additional Resources:

The Center for Career Development in Early Care and Education
Wheelock College
200 The Riverway
Boston, MA 02215
617-734-5200 x2211
http://ericps.ed.uiuc.edu/ccdece/ccdece.html

Healthy Child Care America
American Academy of Pediatrics (AAP)
141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
Contact HCCA Program Manager, American Academy of Pediatrics, for information on potential state training linkages:
888-227-5409 or email childcare@aap.org
http://www.aap.org/

National Association for the Education of Young Children (NAEYC)
1509 16th Street, NW
Washington DC 20036
1-800-424-2460
http://www.naeyc.org

The National Association of Child Care Resource and Referral Agencies (NACCRRA)
1319 F. Street, NW
Suite 500
Washington, DC 20004-1106
Phone: 202-393-5501
http://www.naccrra.net/

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Supervision/Discipline Indicator

These standards are based on state regulations that deal with general supervision, discipline, and in some cases, basic programming related to developmentally appropriate practices. Characteristic of state regulations, the supervision and discipline aspects are emphasized rather than the developmental program aspects. Eight standards are listed for this indicator.

CFOC Standards (1992):

AD 009: Each facility's supervision policy shall specify a) That no child shall be left alone or unsupervised while under the care of the child care staff. Caregivers shall supervise children at all times, even when the children are sleeping (a caregiver must be able to both see and hear infants while they are sleeping). Caregivers shall not be on one floor while children are on another floor. School-age children shall be permitted to participate in activities and visit friends off premises as approved by their parents and by the caregiver(s) b) That developmentally appropriate child:staff ratios shall be met during all hours of operating, including field trips. The policy shall include specific procedures governing supervision of the indoor and outdoor play spaces that describe the child:staff ratio, precautions to be followed for specific areas and equipment, and staff assignments for high-risk areas. The supervision policies of centers and large family-child-care homes shall be written policies.

PR 028: Facilities shall maintain supervision of children at all times as specified in Supervision Policy (AD 009).

PR 031: Discipline shall include positive guidance, redirection, and the setting of clear-cut limits that foster the child's ability to become self-disciplined. Disciplinary measures shall be clear and understandable to the child, shall be consistent, and shall be explained to the child before and at the time of any disciplinary action.

PR 032: Caregivers shall guide the child to develop self-control and orderly conduct in his/her relationships with peers and adults. Caregivers shall show children positive alternatives rather than just telling children "no." Good behavior shall be rewarded. Caregivers shall work with children without recourse to physical punishment or abusive language.

PR 033: The facility shall use the teaching method described in standard PR 032 immediately when it is important to show that aggressive physical behavior toward staff or children is unacceptable. Caregivers shall intervene immediately when children become physically aggressive.

PR 034: Disciplinary practices established by the facility shall be designed to encourage the child to be fair, to respect property, and to assume personal responsibility and responsibility for others.

PR 035: The following behavior shall be prohibited in all child care settings and by all caregivers:

a. Corporal punishment, including hitting, spanking, beating, shaking, pinching, and other measures that produce physical pain.
b. Withdrawal or the threat of withdrawal of food, rest, or bathroom opportunities.
c. Abusive or profane language.
d. Any form of public or private humiliation, including threats of physical punishment.
e. Any form of emotional abuse, including rejecting, terrorizing, ignoring, isolating, or corrupting a child.

PR 036: Children shall not be physically restrained except as necessary to ensure their own safety or that of others, and then only for as long as is necessary for control of the situation. Children shall not be given medicines or drugs that will affect their behavior except as prescribed by their health care provider and with specific written instructions from their health care provider for the use of the medicine.

PR 037: "Time out" that enables the child to regain control of himself or herself and that keeps the child in visual contact with a caregiver shall be used selectively, taking into account the child's developmental stage and the usefulness of "time out" for the particular child.

Research Review/Gap Analysis:

Supervision and discipline of children are clearly intertwined in the research literature (Gross et al., 1999; Arnold et al., 1998). Proper supervision can lessen certain behavioral problems and has a direct impact on injury rates with young children (Wills et al., 1997). Supervision varies with children's age, self-help skills, and activity. The influence of child care teachers' lax and over-reactive discipline on children's behavior problems was examined in a study (Arnold et al., 1998) in which teachers' laxness strongly influenced child misbehavior, and child misbehavior influenced both teachers' over-reactivity and laxness. Teachers' over-reactivity did not influence child misbehavior. Caregivers who attribute misbehaviors to factors internal to the child and controllable by the child responded to the misbehaviors with more power-assertive discipline strategies than did caregivers who offered external or uncontrollable attributions (Scott-Little & Holloway, 1992). Encouraging caregivers to reflect on why children misbehave could influence their responses to children's misbehaviors. In particular, teacher education could be directed toward increasing the salience of environmental factors as an explanation for misbehaviors (Scott-Little & Holloway, 1992).

Most injuries occur to children in unsupervised group situations (Wills et al, 1997). This research suggests that the occurrence of physical injury may be associated with peer presence as well as with lack of supervision, and that having a supervisor present does not guarantee protection from injury. The association between the supervisor's age and peer presence may be important for interpreting future findings about injury risk. The age of directors has dropped in recent years, which causes concern that children may be at greater risk in programs with younger, less experienced staff.

Noncompliance in preschool children is a common problem in child care and results in increased controlling behaviors by caregivers, which is the most frequent complaint of parents of children referred to clinics for treatment of behavior problems. Noncompliance also underlies, or is associated with, a number of other childhood disorders and appears to be a significant predictor of maladjustment later in life. A study (MacKenzie-Keating et al., 1996) showed that the mean rate of compliant behavior for preschool children in child care centers was 84%. Overall compliance increased with age from 2 years to 4 years of age. Children were more responsive to direct requests than to indirect or group requests. Overall, girls were not significantly more compliant than boys, regardless of age or type of request. Teachers delivered more direct requests than either group or indirect requests. Having teachers focus on these cues might help teachers meet the individual needs of children more effectively. This is an area that needs additional research.

Another major concern with discipline is the misinterpretation of punishment as discipline and the resultant negative effects of verbal reprimands and corporal punishment. Many parents, for example, use disapproving verbal statements as a form of punishment to alter undesirable behaviors. If used frequently and indiscriminately, verbal reprimands lose their effectiveness and become reinforcers of undesired behavior. Corporal punishment, especially spanking, is equally less effective as a strategy to eliminate undesired behavior. For example, spanking children under 18 months of age increases the

chance of physical injury and the child is unlikely to understand the connection between the behavior and the punishment. Although spanking may result in a reaction of shock by the child and cessation of the undesired behavior, repeated spanking may result in agitated, aggressive behavior in the child that may lead to a physical altercation between parent and child. Spanking models aggressive behavior as a solution to conflict and has been associated with increased aggression in preschool and school children (American Academy of Pediatrics, 1998). Corporal punishment and frequent and indiscriminate verbal reprimands should never occur in any child care setting.

Summary Table:

Citation: Gross, Sambrook & .Fogg (1999), Behavior problems among young children in low-income urban day care centers, *Research in Nursing & Health*, 22(1):15-25.

Summary: The purposes of this study were to describe: (a) the frequency and correlates of behavior problems among a sample of 2- and 3-year-old children from low-income families as seen by their parents and day care teachers, (b) the degree to which parents and teachers agree about the children's behavior problems in their respective contexts, and (c) family characteristics that distinguish toddlers with behavior problems both at home and at day care from the rest of the sample. Parents of 133 toddlers from ten Chicago day care centers completed measures of child behavior problems, child behavioral intensity, parenting self-efficacy, discipline strategies, and stress. Children's day care teachers also completed a measure of child behavior problems. Parent-reported behavior problems were associated with higher child behavioral intensity, greater parent stress, lower self-efficacy, and discipline strategies characterized by irritability, coercion, and inconsistency. Parent and teacher ratings on child behavior were correlated for boys' behavior problems only. Parents reported more child behavior problems than teachers. Approximately 8% of the children were rated as having behavior problems at home and at day care. Although most of the children are functioning well, many of these parents and toddlers are engaged in highly stressful and coercive relationships.

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Citation: Arnold, McWilliams, & Arnold (1998), Teacher discipline and child misbehavior in day care: untangling causality with correlational data, *Developmental Psychology*, 34(2):276-87.

Summary: Day-care centers provide an ideal, underused setting for studying the developmental processes of child psychopathology. The influence of day-care teachers' lax and over-reactive discipline on children's behavior problems was examined, as was the influence of children's behavior problems on teachers' discipline. Participants were 145 children and 16 day-care teachers from eight classrooms in a day-care center for children from low-income families. Two techniques are presented for estimating causal relations based on correlational data gathered from day-care centers: 2-stage least squares and simultaneous structural equation modeling. Across techniques, teachers' laxness strongly influenced child misbehavior, and child misbehavior influenced both teachers' over-reactivity and laxness. Teachers' over-reactivity did not influence child misbehavior.

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Citation: Wills et al. (1997), Supervision in childhood injury cases: a reliable taxonomy,

Accident Analysis & Prevention, 29(1):133-7.

Summary: This paper describes the development of the "Chicago Children's Supervision Taxonomy"

which operationally defines supervision based on the age of an injured child and the ages, familiarity, and proximity of that child's companions. The reliability, coverage, and utility of this taxonomy are illustrated by its application to 142 cases of urban childhood pedestrian injury. All cases were unambiguously classified with good interrater reliability. Most injured children were in unsupervised groups (42%) but 36% had supervisors nearby, thus, supervisor presence does not guarantee protection. Supervising more than one child (especially likely when the supervisor was a teenager) may increase injury risk compared with one-to-one supervision. The taxonomy provides a needed framework adaptable for describing direct supervision in most child injury situations and can facilitate studies of more complex aspects of supervision.

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Citation: Wills et al. (1997), Patterns and correlates of supervision in child pedestrian injury, *Journal of Pediatric Psychology* , 22(1):89-104.

Summary: Described supervision in 142 child pedestrian injuries (PI), based on presence and proximity of supervisors and/or peers. Children (5-12 years), families, sites, and PI events were described via record reviews, interviews, questionnaires, and site investigation. Supervision of PI victims varied with family size and cohesion, and with children's age, self-help skills, nearness to home, and activity (playing or journey). Peer presence was associated with more impulsive behavior among supervised (but not among unsupervised) PI victims. Definitions of supervision parameters offered here can aid research on the complex relationship between supervision and PI risk.

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Citation: Arnold et al. (1998), Teacher Discipline and Child Misbehavior in Day Care: Untangling Causality with Correlational Data, *Developmental Psychology*, 34(2):276-87.

Summary: Used least squares analysis and simultaneous structural equation modeling to examine the bi-directional relationship between day-care teachers' lax, over reactive discipline and young children's behavior problems. Found that teachers' laxness strongly influenced child misbehavior and child misbehavior influenced teachers' over reactivity and laxness. Teachers' over-reactivity did not influence child misbehavior.

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Citation: Watson (1995), *Behaviour Management in Context* .

Summary: Based upon the belief that what children learn from adult responses to their early behavior sets the foundations on which they will build all future learning, this publication provides information for teachers on the appropriate guidance and management of children's behavior in early childhood settings using a contextual approach. Issues discussed in the document include: 1) setting a behavior policy for the institution; 2) building positive relationships with children; 3) using a knowledge of child development to create appropriate expectations for behavior; 4) considering developmental issues in responding to children's behavior; 5) understanding the impact of changes and loss on children's behavior; 6) examining the variety of family lifestyle issues, such as family routines, living situations, and family tensions; 7) identifying the effects of sociocultural backgrounds on children's behavior, including Aboriginal and Torres Strait Island children; 8) understanding the personal characteristics of each child; 9) realizing the impact of various chronic or acute illness on children's behavior; 10) dealing with children's aggression; 11) creating behavior-friendly classroom environments; 12) developing a

plan when behavior problems arise; 13) working with parents; 14) responding to particular behavior problems, such as out of control feelings, emotional stress, regression, and separation anxiety; 15) talking to a child when there is a problem; and 16) using a checklist to identify and evaluate possible strategies for guiding children's behavior.

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Citation: MacKenzie-Keating et al. (1996), Natural Rates of Compliant Behavior in Preschool Children in Day Care Settings, *Early Child Development & Care*, 124, 91-103.

Summary: Collected data on natural rates of compliance of preschool children in day care centers. Found a mean rate of 84%. Also found that overall compliance increased with age, that children were more compliant to direct requests (of which teachers gave more) than to indirect or group requests, and that girls were not significantly more compliant than boys.

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Citation: Couchenour (1994), *Bright Ideas: Learning All Day. Curriculum for Infants and Toddlers.*

Summary: Using as a framework concerns and problems which two early childhood educators encountered in connection with curriculum in programs for infants and toddlers, this guide focuses on common questions about child developmental needs shared by caregivers and parents. The chapters consider the following questions: 1) "What Is Curriculum?" attempts to come up with a working definition of curriculum for infants and toddlers; 2) "What Kind of Curriculum Should We Use?" asserts that play is the primary teaching method; 3) "What Will the Children Learn?" includes a discussion of physical-motor development, cognitive and language development, and social and emotional development; 4) "What Kinds of Discipline Will We Use?"; and 5) "How Do We Measure the Child's Development?" includes running records, time samples, developmental checklists, and formal measures. A reproducible letter to parents concerning parent participation and understanding of the child care program is included, as is a list of nine teacher resources.

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Citation: Robinson (1996), *Aggressive Behavior in the Pre-Verbal Child.*

Summary: Directors, teachers, parents, and mental health professionals in child care centers were interviewed about aggressive behavior of pre-verbal children to determine the caregivers' level of understanding about children's emotional development. The definition of aggressive behavior included hitting, biting, pushing, scratching, pinching, grabbing, tantrums, whining or screaming, pulling hair, walking on another child, and running into people. Hitting, biting, and pushing were the mostly commonly observed problems. Ways that aggressive behaviors were handled by the centers were analyzed in terms of intervention techniques, center rules and procedures, and parent roles. The various approaches illustrated helplessness toward and misunderstanding of children's emotions. It was concluded that caregivers need more knowledge of children's emotional development. Commentary is offered about the intervention strategies employed, and examples are given to show the extent of parent anger, guilt, and stress over handling aggressive children. An eight-point plan is suggested for centers to use when confronted with aggressive behavior. The plan includes adapting the curriculum, recognizing the value of calm adult reactions, taking care of both victims and aggressors, keeping logs of behavioral problems, and establishing a cooperative relationship between the center and the parent.

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Citation: Kuhns et al. (1992), Mothers' and Child-Care Providers' Cognitive, Affective, and Behavioral Responses to Children's Misbehavior, *Early Education & Development*, (3)3:232-43.

Summary: Mothers and caregivers responded to hypothetical incidents in which a four-year-old child misbehaved. Mothers and caregivers differed in their causal attributions for children's misbehavior and their affective and behavioral responses to children's failures to be altruistic. Assertions of power were likely when respondents believed misbehavior was caused by stable personality factors.

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Citation: Scott-Little, & Holloway (1992), Child care providers' reasoning about misbehaviors: Relation to classroom control strategies and professional training, *Early Childhood Research Quarterly*, 7 (4):595-606.

Summary: Explored the relationship between causal explanations or attributions caregivers form regarding aggressive and rebellious behaviors in their classrooms and their behavioral responses to the misbehaviors. Forty female caregivers (aged 21-54 yrs) were observed during classroom activities, and details about caregiver responses to two instances of child misbehavior were noted. Subsequent to the observation period, caregivers were asked to indicate why they thought a child had misbehaved. Attributions were coded along dimensions of locus of causality, controllability by the child, and stability over time. Caregivers who attributed misbehaviors to factors internal to the child and controllable by the child responded to the misbehaviors with more power-assertive discipline strategies than did caregivers who offered external or uncontrollable attributions.

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Citation: Sternberg et al. (1991), Does out-of-home care affect compliance in preschoolers? *International Journal of Behavioral Development* , 14(1):45-65.

Summary: One hundred and forty first-born Swedish children (aged 11-24 months) were observed with their mothers in two situations (a problem-solving task and a clean-up session). Individual differences in their behavior were then related to measures of the quality of care received by them both at home and in alternative care settings when they averaged 16, 28, and 40 months of age; the amount of social support reportedly received by the mother; the children's ages; and the amount of early out-of-home care received. Analyses show that subjects were more compliant in the task situation at 40 months when they had experienced high quality care at home, when they were older, and when they had experienced less out-of-home care before 24 months of age.

Additional Resources:

American Academy of Pediatrics (AAP)
141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
Phone: 847-228-5005
Fax: 847-228-5097
http://www.aap.org/

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Fire Drills Indicator

This indicator had a relatively direct crosswalk between state regulations and CFOC standards. Most state regulations did not vary much with this indicator and that was reflected in the national database. Five standards are representative of this indicator.

CFOC Standards (1992):

AD 031: The facility shall have a written plan for reporting and evacuating in case of fire, flood, tornado, earthquake, hurricane, blizzard, power failure, or other disaster that could create structural damages to the facility or pose health hazards. The facility shall also include procedures for staff training on this emergency plan.

AD 032: Evacuation drills shall be practiced as follows in areas where natural disasters occur: for tornadoes, on a monthly basis in tornado season; for earthquakes, every 6 months; and for hurricanes, annually.

AD 033: The center director shall use a daily class roster in checking the evacuation and return to a safe indoor space of all children in attendance during an evacuation drill. Small and large family home caregivers shall count to be sure that all children are safely evacuated and returned to a safe indoor space during an evacuation drill.

AD 034: A fire evacuation procedure shall be approved by a fire inspector and shall be practiced at least monthly from all exit locations at varied times of the day and during varied activities, including naptime.

AD 035: A fire evacuation procedure shall be maintained by the caregiver and practiced at least monthly from all exit locations at varied times of the day and during varied activities, including naptime.

Research Review/Gap Analysis:

Children under the age of 5 are 2.5 times more likely to die from fire than any other childhood age group. The vast majority of fire-related deaths occur in family residences, with the majority in one- and two-family dwellings. Unfortunately, not many recent empirical demonstrations or evaluations of fire-safety programs for preschool children exist. A program called Kid Safe was particularly successful. In this program, preschool children showed significantly greater knowledge gains from pre-test to post-test than did children who did not receive the program. Three-year-olds showed the greatest change of any age group. This program provides support for the value of training preschool children in fire safety as an important strategy for injury prevention in this age group. This is an area that needs additional research and program development.

The Kid Safe program is a 30-hour program with daily 20-minute sessions covering nine lessons presented over an 18-week period. Separate lessons teach children about hot and cold items, the use of matches and lighters, the proper procedure if clothing catches on fire, the difference between good fires and bad fires, the importance of smoke detectors, safe departure from a burning house, how to cool burns, and the role of the firefighter as a community helper. Much of the program emphasizes "cognitive" aspects of fire safety such as situations to avoid, things not to play with, etc. Other portions use behavioral techniques (such as modeling, role playing, and rehearsal during simulated emergency situations) to instruct children in specific behavior sequences, such as "Stop, Drop, and Roll" when their clothes catch on fire, or when there is smoke, "Crawl Low."

Summary Table:

Citation: Gielen, Dannenberg, Ashburn, & Kou (1996), Teaching safety: evaluation of a children's village in Maryland, *Injury Prevention* , 2(1):26-31.

Summary: The purpose of this study was to evaluate Children's Village, a life safety education facility for children. The study took place in Washington County, Maryland, a rural county. Eight elementary schools with 20 second grade classrooms (410 students aged 7 and 8) were selected to participate. Using a quasi-experimental design, tests were administered to two cohorts of children before (pre-test) and after (post-test) they attended the Children's Village during 1993-1994. Parent and teacher surveys were also completed after the program. Among children who attended in December 1993-January 1994, there was a significant improvement in average test scores between the pretest (58% correct) and post-test (78%). Among children who attended in April 1994, there also was a significant improvement in test scores between pretest (74%) and post-test (85%). Among parents, 70% reported that their child learned a great deal at Children's Village and 33% reported having made changes in their home as a result. The parent survey also revealed that 25% of children and 35% of adults did not always wear their seat belts, and 74% of children did not always wear bicycle helmets. Teachers' responses to the program were generally positive. Children's Village brought together an extensive network of community leaders, parents, and teachers dedicated to safety education of children. The curriculum had a positive impact on children's knowledge and, to a lesser extent, on parents' safety practices. Program impact could be enhanced by more emphasis on automobile restraints and helmets (behaviors that parents reported were not consistently practiced) and by expanding the village services to parents as well as children. Others considering creating similar programs need to identify community leaders willing to commit the time, effort, and resources required to develop and sustain such programs.

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Citation: English, & Hendricks (1997), Learn Not To Burn, *Children & Families*, 16(2):40-41.

Summary: Describes the "Learn Not to Burn Preschool Program," a low-cost fire safety awareness and burn prevention curriculum for young children. The program promotes eight burn prevention methods--including practicing an escape plan--using developmentally appropriate learning objectives to increase children's fire safety knowledge, skill, and understanding. Evaluation data suggest that participating Head Start children increased their fire-safety skills.

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Citation: McConnell, Leeming, & Dwyer (1996), Evaluation of a fire-safety training program for preschool children, *Journal of Community Psychology* , 24(3):213-227.

Summary: Described an empirical evaluation of a fire-safety program for preschool children ages 3, 4 and 5 years. Four hundred and forty-three subjects from ten child-care facilities participated. Children in six centers received an 18-week training program called Kid Safe. Children in four other centers were assigned to the delayed-treatment condition and constituted the comparison group. All subjects were pretested with a modified 48-question multiple choice comprehensive fire-knowledge test. The same test was re-administered to all subjects following presentation of the program to the treatment group. At each of the three ages, subjects in the treatment group showed significantly greater knowledge gains from pre-test to post-test than did subjects in the comparison group. Three year olds showed the greatest change of any age group. Findings provide support for the value of training preschool children in fire safety as an important strategy for injury prevention in this age group.

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Citation: Bednarczyk, Alexander-Whiting, & Solit (1994), Guidelines for the adaptation of preschool environments to integrate deaf, hard of hearing, and hearing children, *Children's Environments Quarterly*, 11(1):6-15.

Summary: Discusses the integration of deaf and hard-of-hearing (HOH) children in the preschool environment. The authors suggest that a quality early childhood program can be successfully expanded to accommodate deaf, HOH, and hearing children with in-service training and the addition of staff who can communicate with the deaf and HOH children, and with additional physical and visual modifications. Recommended modifications to aspects of the environment include increased visual stimulation, safe physical layout, deaf/HOH staff and trained hearing staff to work with deaf and HOH children, an appropriate communication milieu, cultural sensitivity, knowledge of applicable laws, sign language training, and appropriate curriculum activities. Safety concerns should also be considered, especially for fire drills and alarms and for playground procedures.

Additional Resource:

National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, MA 02269-9101
617-770-3000
http://www.nfpa.org

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Medication Indicator

State regulations for this indicator were very specific and cross walked clearly to the seven standards listed here. Exact wording was not present in doing the crosswalk but the essence of the regulations is captured in these CFOC standards.

CFOC Standards (1992):

HP 082: The administration of medicines at the facility shall be limited to: a) Those prescribed medications ordered by a health care provider for a specific child. b) Those nonprescription medications recommended by a health care provider for a specific child, with written permission of the parent or legal guardian referencing a written or telephone instruction received by the facility from the health care provider.

HP 083: Any prescribed medication brought into the facility by the parent, legal guardian, or responsible relative of a child shall be dated, and shall be kept in the original container labeled by a pharmacist with the child's first and last names; the date the prescription was filled; the name of the health care provider who wrote the prescription; the medication's expiration date; and specific, legible instructions for administration, storage, and disposal (i.e., the manufacturer's instructions or prescription label).

HP 084: Any over-the-counter medication brought into the facility for use by a specific child shall be labeled with the following information: the date; the child's first and last names; specific, legible instructions for administration and storage (i.e., manufacturer's instructions); and the name of the health

care provider who made the recommendation.

HP 085: All medications, refrigerated or unrefrigerated, shall have child protective caps, shall be kept in an orderly fashion, shall be stored away from food at the proper temperature, and shall be inaccessible to children. Medication shall not be used beyond the date of expiration.

HP 086: There shall be a written policy for the use of any commonly used, nonprescription medication as specified in Medication Policy.

HP 087: Any caregiver who administers medication shall be trained to check for the name of the child, to read the label/prescription directions in relation to the measured dose, frequency, and other circumstances relative to administration (e.g., relation to meals); and to document properly that the medication was administered.

Research Review/Gap Analysis:

According to the Centers for Disease Control and Prevention, children in child care are 18 times more likely to acquire an infectious disease than children who are not. Group child care is perfect for spreading infectious organisms rapidly—not only the common cold and flu, but also Salmonella, the agents that cause meningitis, and even hepatitis viruses. According to the National Standards for Health and Safety *Caring for Our Children*, children with meningitis and Hepatitis A should be permitted to attend if prophylaxis has begun. Children with Hepatitis B or C should be permitted to attend if staff observe standard precautions.

Children in child care are more likely to be taking medication—both over-the-counter preparations and prescription drugs (decongestants, expectorants, antihistamines, antibiotics, and inhalers) because of this increased risk of acquiring an infectious disease. Child care staff are often obligated to administer a variety of medications, often at inconvenient times, to a number of children (Moser, 1995).

Over-the-counter medications should be used in child care only with written permission of the parent or guardian and instructions from a physician. Because use of any medication in child care puts an increased burden on providers, parents should ask their physicians to modify dose schedules to avoid the hours that children are in child care (Aronson, 1991).

The National Health and Safety Performance Standards, National Academy of Early Childhood Programs accreditation criteria, Head Start Performance Standards, and state licensing requirements specifically address administration of medicines in child care programs. It is essential that every child care program have a written policy and clear procedures on giving medicines. Delegation in medication administration is another key area that needs additional research to determine the impact of training programs in the actual administration of medications. The key to medication administration is the three-way collaborative alliance of the child care provider, a medical professional, and the parents.

In addition to the steps mentioned above, the several things can be done to assist in the administration of medication. Medicines must be stored in original, labeled containers in locked cabinets inaccessible to children. Parents should take home any medicines at the end of the day or end of the week. Each center should have designated staff members who are trained and authorized to give medicines. This indicator needs additional research to help fill in some of the gaps that presently exist in determining if training programs are truly effective with staff.

Summary Table:

Citation: Slack-Smith, Read, & Stanley (1998), The use of medication in children attending childcare in Western Australia , *Journal of Pediatrics & Child Health*, 34(2):183-7.

Summary: This paper reports on medication use and factors affecting use in a cohort of preschool children attending long (seven hrs+) day care in centers and family day care in homes. A survey of parents representing 846 children under 6 years old in two types of childcare in Perth, Western Australia. The data were analyzed using descriptive and logistic regression techniques to elucidate factors associated with use of medication. Seventy-three per cent of the children were reported to have used over-the-counter medication at some time, while current regular use of prescribed medication was 11%. This proportion is comparable to the limited available data for children of similar ages in Western Australia. For both medication categories, the use of medication was higher in long day care than family day care. In addition, many other characteristics differed between children in long day care and family day care. Initial analysis showed a number of significant associations between child and family factors and both categories of medication. Multivariable analyses indicated that the most important associations with medication use were with children's illnesses. There was no significant difference between long day care and family day care for use of over-the-counter medication but attending long day care was significantly associated with increased use of prescribed medication (OR=2.13; 95% CI 1.24-3.67) after illnesses had been taken into account. Medication use in children attending childcare is closely related to reported illness in the child.

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Citation: Hale, & Polder (1995), *The ABCs of Safe and Healthy Child Care: A Handbook for Child Care Providers* .

Summary: Recognizing the importance of maintaining a safe and healthy child care setting, this manual for home or center child care providers contains information and guidelines to help providers maintain child health and reduce sickness and injuries. Part 1, "Introduction," describes how diseases are spread and how to prevent and prepare for unintentional and intentional injuries, and provides guidelines for recognizing child abuse. Part 2 of the guide, "Establishing Policies to Promote Health and Safety," makes recommendations for developing written policies for health history and immunizations for day care children and care providers, exclusion for illness, incident reporting, emergency illness or injury procedures, children with special needs, medication administration, nutrition/foods brought from home, as well as smoking and the use of alcohol and illegal drugs. Part 3, "Following Protective Practices to Reduce Disease and Injury," describes basic disease and injury protection practices, including stress reduction, handwashing and diapering routines, use of toilet training equipment, cleaning and disinfecting routines, use and handling of toothbrushes, and food safety and sanitation. Part 4, "Maintaining a Safe and Healthy Facility," details the contents of a written safety plan, including precautions, evaluation plan and drills pertaining to fire safety, electrical fixtures and outlets, stairways and walkways, indoor furnishings and equipment, outdoor play areas, small objects and toys, firearms, water temperatures, chemical toxins, lead poisoning, air pollution, pets, and exposure to electric and magnetic fields and to heat and ultraviolet rays. Part 5, "Fact Sheets on Childhood Diseases and Conditions," lists a variety of sicknesses and diseases, from asthma and the common cold to yeast infections, and gives the child care provider a general diagnostic description, as well as preventive measures for the illness. Appendices contain additional resources and contact information on regional poison control centers.

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Citation: Aronson (1991), Ask Dr. Sue, *Child Care Information Exchange* , 77, 24-25.

Summary: Answers child care center directors' questions concerning the use of the Haemophilus influenza type b (Hib) vaccine and use of over-the-counter medication with children in child care.

Additional Resource:

American Academy of Pediatrics
141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
Phone: 847-228-5005
Fax: 847-228-5097
http://www.aap.org/

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Emergency Plan/Contact Indicator

This indicator had only the one CFOC standard that represented the state's regulations regarding emergency plans and contact information related to that emergency plan.

CFOC Standards (1992):

APP 28—The facility shall have a written plan for reporting and managing any incident or unusual occurrence that is threatening to the health, safety, or welfare of the children or staff. The facility shall also include procedures for staff training on this emergency plan. The following incidents, at a minimum, shall be addressed in the emergency plan: a) lost or missing child; b) sexual or physical abuse or neglect of a child; c) injuries requiring medical or dental care; d) serious illness requiring hospitalization, death of a child enrolled in the facility, or death of a caregiver, including deaths that occur outside of child care hours. The following procedures, at a minimum, shall be addressed in the emergency plan: e) provision for a caregiver to accompany a child to the emergency care source and remain with the child until the parent or legal guardian assumes responsibility for the child. Provision for a backup caregiver or substitute for large and small family child care homes to make this feasible. Child:staff ratios must be maintained at the facility during the emergency; f) the source of emergency medical care—a hospital emergency room, clinic, or other constantly staffed facility known to caregivers and acceptable to parents; g) ensure that first aid kits are resupplied following each first aid incident, and that required contents are maintained in a serviceable condition, by a periodic review of the contents; h) the names and addresses of a least three licensed providers of dental services who have agreed to accept emergency dental referrals of children and to give advice regarding a dental emergency.

Research Review/Gap Analysis:

Quality child care must take place in safe and healthy settings. Because no environment can be absolutely safe, all staff must be prepared to handle medical emergencies and to use the appropriate emergency medical services (Wiebe & Fuchs, 1999). Staff need to be prepared for emergency situations and injuries, medical emergencies, and need to have emergency medical policies and procedures in place. All child care staff that provide direct care must have training in pediatric first aid, including rescue breathing and first aid for choking. At least one certified staff person should be with the children in care at all times and in all places. Additional research is needed to determine the effectiveness of training programs related to emergency contacts and planning. However, clear indicators of the types of information that child care programs should have readily available at all times are available.

Responding appropriately means preparing adequately through training, practice, and access to necessary information. Certain critical information should be gathered on all children and staff and readily available in an organized, easy-to-use file. Because information often changes, data on each child should be regularly updated. Examples of critical information include: accurate and current contract names and phone numbers, names and phone numbers of medical providers, preferred hospitals, copies of current insurance or Medicaid cards, parent/guardian signatures authorizing emergency care, and information on allergies or chronic health conditions. Emergency phone numbers, resources, and other information should be posted in a highly visible place, such as near the door. Emergency phone numbers and program addresses should be posted by the telephone. Location of the nearest phone, emergency assistance numbers, address of the child care program, name of caregiver, location of fire extinguishers, location of the first aid kit, child abuse hotline numbers, and basic first aid information should also be posted. However, even with all these resources in place, this indicator requires additional research to determine if training in these areas is really effective.

Summary Table:

Citation: Copeland (1996), Code Blue! Establishing a Child Care Emergency Plan, *Child Care Information Exchange*, 107, 17-22.

Summary: Discusses steps necessary to develop an emergency preparedness plan for child care centers: (1) identifying the need for policies through brainstorming and reviewing previous emergencies; (2) identifying potential issues through consultation; (3) establishing center procedures; (4) identifying a spokesperson to present accurate public information; (5) preparing statements to prevent misinformation; and (6) preparing for ongoing support after the emergency.

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Citation: Levin (1991), Your Center Needs an Emergency/Crisis Plan!, *Child Care Information Exchange*, 79, 34-37.

Summary: Describes the development of a five-part plan for dealing with emergencies and crises in day care centers. The plan involves a handout that provides general information about the program, the designation of spokespeople, procedures for responding to both common and extreme emergencies, and media guidelines.

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Citation: Kelly, Kirkland, Holmes, Ellis, Delclos, & Kozinetz (1997), Assessing parental utilization of the poison center: an emergency center-based survey, *Clinical Pediatrics*, 36(8):467-73.

Summary: The purpose of this study was to identify and characterize caretakers who fail to utilize the poison center for unintentional poisonings involving children. The authors interviewed 210 caretakers of children evaluated for unintentional poisoning in the emergency center of an urban, university-based teaching hospital to determine 1) whether demographic differences exist between those caretakers who contacted a poison center prior to the emergency center visit and those who did not and 2) whether differences exist in prevalence of poison prevention knowledge and behaviors between the two groups. Ninety-six (46%) of caretakers did not contact the poison center prior to the emergency center visit. Significant differences were found between the two groups for the following caretaker variables: race/ethnicity, language preference, age, level of education, country in which schooling occurred, and type of insurance coverage for the child. When logistic regression was used to control for confounding,

the two variables associated with failure to use the poison center were black race and schooled outside the United States (primarily in Mexico). Poison center callers reported a higher prevalence of poison prevention knowledge and behaviors than non-callers. Educational interventions should be targeted to the groups of caretakers identified who do not use the poison center.

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Citation: O'Connor, Boyle, O' Connor, & Letellier (1992), Self-reported safety practices in child care facilities, *American Journal of Preventive Medicine*, 8(1):14-8.

Summary: To determine the prevalence of safety hazards and current injury prevention practices in child care settings, we administered a structured telephone interview to a geographically stratified, randomly selected sample of licensed child care facilities. Representatives of 130 child care facilities responded to questions about current injury prevention practices. Specific hazards assessed were related to burns, falls, poisoning, playgrounds, and emergency telephone numbers. Results indicated that 26.8% of providers who knew the temperature of their tap water stated that it was over 130 degrees F.; 14.1% had space heaters accessible to children; 30.3% of those with stairs accessible to children lacked safety gates; 61.4% of those with playgrounds did not have an impact-absorbing surface under playground equipment; 16.9% of respondents had an unexpired bottle of syrup of ipecac; 55.8% demonstrated that a poison control center telephone number was available to them; and 80% of providers could demonstrate the availability of the telephone number of the local ambulance. We conclude that potential and remedial injury hazards exist in some licensed child care centers and that providers of child care within licensed facilities are a promising target for childhood injury prevention interventions.

Additional Resource:

Emergency Medical Services for Children
National Resource Center
111 Michigan Avenue, N.W.
Washington, DC 20010-2970
Phone: 202 884-4927
http://www.ems-c.org/

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Outdoor Playground Indicator

State regulations related to outdoor play areas varied greatly. As a result, many CFOC standards are listed in this indicator. These 29 standards capture the full scope of variation in all of the state regulations.

CFOC Standards (1992):

FA 234: Sunlit areas and shaded areas shall be provided by means of open space and tree plantings or other cover in outdoor spaces.

FA 235: The outdoor play area shall be enclosed with a fence or natural barriers. The barrier shall be at least 4 feet in height and the bottom edge shall be no more than 3 1/2 inches off the ground. There shall be at least two exits from such areas, with at least one remote from the buildings. Gates shall be

equipped with self-closing and positive self-latching closure mechanisms. The latch or securing device shall be high enough or of such a type that it cannot be opened by small children. The openings in the fence shall be no greater than 3 1/2 inches. The fence shall be constructed to discourage climbing.

FA 236: The soil in play areas shall not contain hazardous levels of any toxic chemical or substances. The facility shall have soil samples and analyses performed by the local health department, extension service, or environmental control testing laboratory, as required, where there is good reason to believe a problem may exist.

FA 237: The soil in play areas shall be analyzed for lead content initially. It shall be analyzed at least once every 2 years where the exteriors of adjacent buildings and structures are painted with lead containing paint. Lead in soil shall not exceed 500 ppm. Testing and analyses shall be in accord with procedures specified by the regulating health authority.

FA 238: Sandboxes shall be constructed to permit drainage, shall be covered tightly and securely when not in use, and shall be kept free from cat or other animal excrement.

FA 239: Sand used in sandboxes shall not contain toxic or harmful materials.

FA 240: Outdoor storage shall be available for equipment not secured to the ground, unless indoor storage space is available.

FA 241: Anchored play equipment shall not be placed over, or immediately adjacent to, hard surfaces.

FA 242: Outdoor play equipment shall be of safe design and in good repair. Climbing equipment and swings shall be set in concrete footings located below ground surface (at least 6 inches). Swings shall have soft and, or flexible seats. Access to play equipment shall be limited to age groups for which the equipment is developmentally appropriate.

FA 243: All pieces of playground equipment shall be designed to match the body dimensions of children.

FA 244: All pieces of playground equipment shall be installed so that an average adult will not be able to cause a fixed structure to wobble or tip.

FA 245: All pieces of playground equipment shall be surrounded by a resilient surface (e.g., fine, loose sand; wood chips; wood mulch) of an acceptable depth (9 inches), or by rubber mats manufactured for such use, consistent with the guidelines of the Consumer Product Safety Commission and the standard of the American Society for Testing and Materials, extending beyond the external limits of the piece of equipment for at least 4 feet beyond the fall zone of the equipment. These resilient surfaces must conform to the standard stating that the impact from falling from the height of the structure will be less than or equal to peak deceleration 200G(63). Organic materials that support colonization of molds and bacteria shall not be used.

FA 246: All pieces of playground equipment shall be designed so that moving parts (swing components, teeter totter mechanism, spring ride springs, etc.) will be shielded or enclosed.

FA 247: All pieces of playground equipment shall be free of sharp edges, protruding parts, weaknesses, and flaws in material construction. Sharp edges in wood, metal, or concrete shall be rounded to a minimum of 1/2 inch wide on all edges. Wood materials shall be sanded smooth and shall be inspected

regularly for splintering.

FA 248: All pieces of playground equipment shall be designed to guard against entrapment or situations that may cause strangulation by being made too large for a child's head to get stuck or too small for a child's head to fit into. Openings in exercise rings shall be smaller than 4, inches or larger than 9 inches in diameter. There shall be no openings in a play structure with a dimension between 4 and 5/8 inches and 9 and 1/8 inches. In particular, side railings, stairs, and other locations where a child might slip or try to climb through shall be checked for appropriate dimensions. Protrusions such as pipes or wood ends that may catch a child's clothing are prohibited. Distances between vertical infill, where used, must be 4 and 5/8 inches or less to prevent entrapment of a child's head. No opening shall have a vertical angle of less than 55 degrees. To prevent finger entrapment, no opening larger than 3/8 inch and smaller than 1 inch shall be present.

FA 249: All bolts, hooks, eyes, shackles, rungs, and other connecting and linking devices of all pieces of playground equipment shall be designed and secured to prevent loosening or unfastening except by authorized individuals with special tools.

FA 250: Crawl spaces of all pieces of playground equipment, such as pipes or tunnels, shall be securely anchored to the ground to prevent movement, and shall have a minimum diameter that permits easy access to the space by adults in an emergency or for maintenance.

FA 251: The maximum height of any piece of playground equipment shall be no greater than 5 and 1/2 feet if children up to the age of 6 are given access to it, and no higher than 3 feet if the maximum age of children is 3 years.

FA 252: All paved surfaces shall be well drained to avoid water accumulation and ice formation.

FA 253: All walking surfaces, such as walkways, ramps, and decks, shall have a nonslip finish.

FA 254: All walking surfaces and other play surfaces shall be free of holes and sudden irregularities in the surface.

FA 255: Space used for wheeled vehicles shall have a flat, smooth, and nonslippery surface. There shall be a physical barrier separating this space from traffic, streets, parking, delivery areas, driveways, stairs, hallways used as fire exits, balconies, and pools and other areas containing water.

FA 256: All outdoor activity areas shall be maintained in a clean and safe condition by removing debris, dilapidated structures, broken or worn play equipment, building supplies, glass, sharp rocks, twigs, toxic plants, and other injurious material. The play areas shall be free from anthills, unprotected ditches, wells, holes, grease traps, cisterns, cesspools, and unprotected utility equipment. Holes or abandoned wells within the site shall be properly filled or sealed. The area shall be well drained with no standing water.

FA 257: Outdoor play equipment shall not be coated or treated with, nor shall it contain, toxic materials in hazardous amounts that are accessible to children.

FA 258: The center director and the large and small family home caregiver shall conduct inspections of the playground area and the playground as specified below.

FA 259: The general playground surfaces shall be checked every day for broken glass, trash, and other foreign materials (e.g., animal excrement).

FA 260: The playground area shall be checked on a daily basis for areas of poor drainage and accumulation of water and ice.

FA 261: Any particulate resilient material beneath playground equipment shall be checked at least monthly for packing due to rain or ice and, if found compressed, shall be turned over or raked up to increase resilience capacity. All particulate resilient material, particularly sand, shall be inspected daily for glass and other debris, animal excrement, and other foreign material. Loose fill surfaces shall be hosed down for cleaning and raked or sifted to remove hazardous debris as often as needed to keep the surface free of dangerous, unsanitary materials.

FA 262: The playground equipment shall be checked on a monthly basis for the following:

a. Visible cracks, bending or warping, rusting, or breakage of any equipment.
b. Deformation of open hooks, shackles, rings, links, and so forth.
c. Worn swings hangers and chains.
d. Missing, damaged, or loose swing seats.
e. Broken supports or anchors.
f. Cement support footings that are exposed, cracked, or loose in the ground.
g. Accessible sharp edges or points.
h. Exposed ends of tubing that require covering with plugs or caps.
i. Protruding bolt ends that have lost caps or covers.
j. Loose bolts, nuts, and so forth that require tightening.
k. Splintered, cracked, or otherwise deteriorating wood.
l. Lack of lubrication on moving parts.
m. Worn bearings or other mechanical parts.
n. Broken or missing rails, steps, rungs, or seats.
o. Worn or scattered surfacing material.
p. Hard surfaces, especially under swings, slides, and so forth (e.g., places where resilient material has been shifted away from any surface underneath play equipment).
q. Chipped or peeling paint.
r. Pinch or crush points, exposed mechanisms, juncture, and moving components.

Research Review/Gap Analysis:

Though child care center injury rates are relatively low, the majority of injuries occur on outdoor playgrounds. Many injuries that occur in this setting are minor. However, lowering the height of playground equipment and providing more resilient playground surfaces could further reduce injury risks in child care centers. The injury rate was 1.5 injuries per 100,000 child hours in child care. The most common injuries were cuts or lacerations (31%), bumps or bruises (15%), fractures (10%), and dental injuries (8%). Most injuries (51%) occurred on the playground. Many injuries (18%), and more than half of factures and concussions (53%) were due to falls from climbing equipment. (Briss, Sacks, Kresnow, & O'Neill, 1993). The most important risk factor for injury was the height of the tallest piece of climbing equipment on the playground (Briss, Sacks, Addiss, Kresnow, & O'Neill, 1995).

Previous research has documented that the majority of injuries occurring in child care involve falls, and that the most common consumer product associated with such falls is playground equipment. A recent study of children less than 5 years of age admitted to hospitals between 1979 and 1988 for injuries associated with playground equipment found that significantly more injuries occurred in the home than in child care facilities. Fractures were the most common injury, and the head was the most commonly involved body region. Lower limb injuries were usually the most severe. Among the differences

between home and child care injuries were the type of equipment involved. For instance, swings were disproportionately associated with head injuries (Kotch, Chalmers, Langley, & Marshall, 1993).

Another study was conducted to determine the prevalence of safety hazards and current injury prevention practices in child care settings (O'Connor, O'Connor, Boyle, & Letellier, 1992). Results from this study indicated that 27% of providers who knew the temperature of their tap water stated that it was over 130 degrees F, 14% had space heaters accessible to children, 30% of those with stairs accessible to children lacked safety gates, 61% of those with playgrounds did not have an impact-absorbing surface under playground equipment, 17% had an unexpired bottle of syrup of ipecac, 56% demonstrated that a poison control center phone number was available to them, and 80% of providers could demonstrate the availability of the phone number of the local ambulance.

Concern for the safety of children in out-of-home care is growing along with the number of such children. The above studies clearly demonstrate that injuries among children in child care centers occur on playgrounds and are the results of falls affecting the head and upper limbs. Such injuries are often related to reversible hazards on child care playgrounds. Targeted funding might improve child care playground safety. It is also possible to conduct abbreviated playground safety surveys with minimal demand on the time of child care staff. Results from a study of Smart Start in North Carolina holds promise as a potential solution to improving playground safety (Kotch & Guthrie, 1998).

Several excellent resources can be used to help reduce the risks or at least be able to identify and respond to risks. The *National Playground Safety* manual developed by the University of North Iowa or CDC's *Handbook for Public Playground Safety* or NAEYC's *Healthy Young Children* include playground safety information. Other excellent resources are the *CPSC Handbook for Public Playground Safety, ASTM/CPSE Audit Guide* by Dr. Frances Wallach, published by Playworld Systems, and the National Playground Safety Institute of the National Parks and Recreation Association course to certify playground inspectors.

Summary Table:

Citation: Ulione & Dooling (1997), Preschool injuries in child care centers: nursing strategies for prevention, *Journal of Pediatric Health Care*, 11(3):111-6.

Summary: Injuries to children 0 to 12 years of age pose a national health problem. Injuries are a particular problem in child care settings. Both research and anecdotal reports confirm that most injuries in the child care setting are cuts, scratches, and abrasions caused by falls indoors and in playgrounds. Other injuries are caused by human bites and motor vehicle pedestrian injuries. Child development centers are an obvious focal point to direct injury prevention services by nurses. The nurse's role in injury prevention is to educate the child care providers about injuries and then teach them the skills to assess and monitor injury prevention strategies. This article discusses the problem of injuries in child care centers in general and discusses injury prevention strategies the nurse can share with the child care provider. Educational resources are included to help the child care providers assess and monitor their own center's injury risk.

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Citation: Cummings, Rivara, Boase, & MacDonald (1996), Injuries and their relation to potential hazards in child day care, *Injury Prevention* , 2(2):105-8.

Summary: To prospectively determine the incidence rate of injuries that required medical attention

among children in day care and to identify possible hazards related to these injuries. Prospective cohort study of children in a sample of licensed day care facilities. From 1 July 1992 to 30 June 1993, 53 medically attended injuries were reported by 133 day care sites; incidence rate 1.9 per 100,000 hours of day care attendance. The rate of injury in 91 small family day care homes was essentially the same as that in 42 larger day care centers; relative rate 1.0 (95% confidence interval 0.6 to 1.9). Injuries that required sutures accounted for 39% of the cases, while 17% required a cast, splint, or sling. No child was hospitalized. Sixty-nine sites were inspected and all had potentially correctable physical hazards, with a median of 15 hazards per site (range 7 to 26). These potential hazards had little relationship to the risk of injury and a case-by-case review identified only two injuries that might have been prevented by a more energy absorbent playground surface. The incidence of medically attended injuries found in this study is consistent with other studies from the United States. Most injuries were minor and had little relation to physical hazards at day care locations.

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Citation: Browning, Runyan, & Kotch (1996), A statewide survey of hazards in child care centers, *Injury Prevention*, 2(3):202-7.

Summary: The purpose of this study was to determine adherence to selected recommended safety standards in North Carolina child care centers. 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. 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%). 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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Citation: Briss, Sacks, Addiss, Kresnow, & O'Neil (1995), Injuries from falls on playgrounds. Effects of day care center regulation and enforcement, *Archives of Pediatrics & Adolescent Medicine* , 149(8):906-11.

Summary: To measure the incidence of playground fall injuries among children attending licensed U.S. day care centers and to evaluate how injury incidence varies with center characteristics and with the regulatory and enforcement climate in which centers operate. Telephone surveys of directors of day care centers and enforcement agencies and review of written day care regulations. Probability sample of licensed day care centers in 50 states and the District of Columbia. Children attending day care centers with playgrounds. Medically attended playground fall injuries. Among the 1740 day care centers studied, a weighted total of 89.2 injuries occurred during the 2-month study period (0.25/100,000 child-hours in day care). The most important risk factor for injury was height of the tallest piece of climbing equipment on the playground in both bivariate (P = .01) and multivariate (P = .02) analyses. Neither regulations addressing playground safety or playground surfaces nor enforcement patterns were associated with lower injury rates. Additional effort is needed to develop and evaluate regulations and enforcement that reduce injury risks for children while minimizing burden on day care centers. In the

meantime, limiting climbing equipment heights may reduce playground injury rates.

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Citation: Briss, Sacks, Addiss, Kresnow, & O'Neil (1994), A nationwide study of the risk of injury associated with day care center attendance, *Pediatrics,* 93(3):364-8.

Summary: Because an increasing proportion of U.S. children spends time in day care center environments, a national estimate of injury risks in day care centers is needed. Interviewed directors of 1797 day care centers from every state and the District of Columbia from October to December 1990 and analyzed medically attended injuries and center characteristics reported by the directors. The centers were attended by 138,404 children. In the two months before the center directors were interviewed, 556 children sustained injuries requiring medical attention while attending the centers. The injury rate was 1.5 injuries per 100,000 child hours in day care. The most common injuries were cuts or lacerations (31%), bumps or bruises (15%), fractures (10%), and dental injuries (8%). Most injuries (51%) occurred on the playground. Many injuries (18%), and more than half of fractures and concussions (53%) were due to falls from climbing equipment. Day care center injury rates estimated by this study were relatively low. Many injuries that occur in this setting are probably minor. However, lowering the height of playground equipment and providing more resilient playground surfaces could further reduce injury risks in day care centers.

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Citation: Kotch, Chalmers, Langley, & Marshall (1993), Child day care and home injuries involving playground equipment, *Journal of Pediatrics & Child Health*, 29(3):222-7.

Summary: The increasing number of children attending child day care has led to a corresponding concern for their safety in the absence of parental care. Previous studies have documented that the majority of injuries occurring in child day care involve falls, and that the most common consumer product associated with such falls is playground equipment. This study describes New Zealand children less than 5 years of age admitted to hospital between 1979 and 1988 for injuries associated with playground equipment located at home or a child care facility. There were 528 hospitalized home injuries involving playground equipment, and 145 such day care injuries. Fractures were the most common injury, and the head was the most commonly involved body region. Lower limb injuries were the most severe. Among the differences between home and day care injuries were the type of equipment involved. Swings were disproportionately associated with head injuries.

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Citation: O'Connor, Boyle, O' Connor, & Letellier (1992), Self-reported safety practices in child care facilities, *American Journal of Preventive Medicine,* 8(1):14-8.

Summary: To determine the prevalence of safety hazards and current injury prevention practices in child care settings, the authors administered a structured telephone interview to a geographically stratified, randomly selected sample of licensed child care facilities. Representatives of 130 child care facilities responded to questions about current injury prevention practices. Specific hazards assessed were related to burns, falls, poisoning, playgrounds, and emergency telephone numbers. Results indicated that 26.8% of providers who knew the temperature of their tap water stated that it was over 130 degrees F; 14.1% had space heaters accessible to children; 30.3% of those with stairs accessible to children lacked safety gates; 61.4% of those with playgrounds did not have an impact-absorbing surface under playground

equipment; 16.9% of respondents had an unexpired bottle of syrup of ipecac; 55.8% demonstrated that a poison control center telephone number was available to them; and 80% of providers could demonstrate the availability of the telephone number of the local ambulance. The authors conclude that potential and remedial injury hazards exist in some licensed child care centers and that providers of child care within licensed facilities are a promising target for childhood injury prevention interventions.

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Citation: Sacks, Brantley, Holmgreen, & Rochat (1992), Evaluation of an intervention to reduce playground hazards in Atlanta child-care centers, *American Journal of Public Health*, 82(3):429-31.

Summary: In 1988, the authors identified playground hazards at 58 child-care centers (CCCs) and intervened by showing the director the hazards and distributing safety information. In 1990, we evaluated the 58 intervention CCCs as well as 71 randomly selected control CCCs. Intervention centers had 9.4 hazards per playground; control centers had 8.0. The authors conclude that the intervention was ineffective.

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Citation: Runyan, Gray, Kotch, & Kreuter (1991), Analysis of US child care safety regulations, *American Journal of Public Health* , 81(8):981-5.

Summary: With 1.9 million US children cared for in organized group child care, the safety of these children is a public health concern. In the absence of federal policy, each state has developed its own day care safety regulations. After creating a set of 36 criteria from three sets of national guidelines, we assessed the safety regulations of 45 states. With a mailed survey of state day care regulatory personnel, we examined the processes of formulating and implementing safety policy in 47 states. For 24 of the 36 items, more than half the states' regulations were below the criteria or failed to mention the topic. Most notable is the inattention to playground safety, choking hazards, and firearms. The uneven quality of regulations may be a reflection of a regulatory process that is fragmented, with many different groups sharing authority and with limited involvement of injury prevention specialists.

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Citation: Kotch, & Guthrie (1995), *Effect of a Smart Start Playground Improvement Grant on Child Care Playground Hazards. Smart Start Evaluation Report* .

Summary: Smart Start (North Carolina) playground improvement grants were awarded to cover playground safety assessment, planning and evaluation, quality enhancements (such as fencing, surfacing, and new equipment), and safety programs. Visual inspections were conducted of the safety of child care home and center playgrounds after Smart Start-sponsored safety improvements were made. The inspections were conducted by specially trained playground safety inspectors, and the findings compared with those of similar inspections made in a non-Smart Start county. Comparison findings indicated that on each of 15 safety criteria, the Smart Start facilities were rated higher than the those in the non-Smart Start county. The findings suggest that improved child care playground safety is related to receipt of Smart Start playground improvement grants. The study also demonstrated the feasibility of conducting abbreviated playground safety surveys with minimal demand on the time of child care staff. Statistical data of the inspections and glossary of safety inspection points are included.

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Citation: Briss et al. (1994), A Nationwide Study of the Risk of Injury Associated with Day Care Center Attendance, *Pediatrics,* 93(3):364-68.

Summary: Interviewed day-care center directors to determine injury rates. Found that injury rates were relatively low and that many of the injuries that occur in this setting are probably minor. Suggests that lowering height of playground equipment and providing more resilient playground surfaces could further reduce injury risks.

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Citation: Aronson (1992), Ask Dr. Sue--Is Playground Safety Being Taken Seriously?,

Child Care Information Exchange, 85, 47-48.

Summary: Reviews Center for Disease Control research findings on playground hazards at child care centers in Atlanta, Georgia. Discusses safety requirements for surfacing under climbing equipment. Describes resources for more information.

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Citation: Sacks et al. (1992), Evaluation of an Intervention to Reduce Playground Hazards in Atlanta Child-Care Centers, *American Journal of Public Health*, 82(3):429-31.

Summary: Revisits 58 child care centers in Atlanta (Georgia) that had received interventions alerting directors to playground safety hazards. Comparison with 71 control centers randomly selected found averages of 9.4 hazards at intervention center playgrounds and 8.0 hazards at control centers. These results indicate the ineffectiveness of the intervention.

Additional Resources:

Consumer Product Safety Commission (CPSC)
1-800-638-2772
http://www.cpsc.gov

The National Program for Playground Safety
School for Health, Physical Education and Leisure Services
WRC 205

University of Northern Iowa
Cedar Falls, Iowa 50614-0618
Phone: 1-800-554-PLAY
http://www.uni.edu/playground/home.html/

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Toxic Substances Indicator

The following 19 CFOC standards are the ones that best represent the state regulations that appear in the national data base for weighted licensing indicators.

CFOC Standards (1992):

FA 120: Cleaning materials, detergents, aerosol cans, pesticides, health and beauty aids, poisons, and other toxic materials shall be stored in their original labeled containers and shall be used according to the manufacturer's instructions and for the intended purpose. They shall be used only in a manner that will not contaminate play surfaces, food, or food preparation areas, and that will not constitute a hazard to the children. When not in actual use, such materials shall be kept in a place inaccessible to children and separate from stored medications and food.

FA 121: The poison control center and or physician shall be called for advice about safe use of any toxic products (e.g., pesticides, plants, rat poison) or in any ingestion emergency, and their advice shall be documented in the facility's files. The poison information specialist and or physician shall be told the child's age and sex, the substance swallowed and the estimated amount, and the condition of the child.

FA 122: Employers shall provide child care workers with hazard information, as required by the Occupational Safety and Health Administration (OSHA), about the presence of toxic substances such as asbestos or formaldehyde. Such information shall include the identification of the ingredients of art materials and disinfectants.

FA 123: When the manufacturer's Material Data Safety Sheet shows the presence of any toxic effects, these materials shall be replaced with nontoxic substitutes. If no substitute is available, the product shall be eliminated.

FA 124: Radon concentrations shall be less than 4 picocuries per liter of air.

FA 125: Any asbestos that is friable or in a dangerous condition found within a facility shall be removed by a contractor certified to remove asbestos, encapsulated, or enclosed in accordance with existing regulations of the Environmental Protection Agency, the federal agency responsible for asbestos abatement.

FA 126: Pipe and boiler insulation shall be sampled and examined in an accredited laboratory for the presence of asbestos in a friable or potentially dangerous condition.

FA 127: Nonfriable asbestos shall be identified to prevent disturbance and or exposure during remodeling or future activities.

FA 128: Chemicals used in lawn care treatments shall be limited to those listed as nonrestricted use. All chemicals used inside or outside shall be stored in their original containers in a safe and secure manner, accessible only to authorized staff. They shall be used only according to manufacturers' instructions, and in a manner that will not contaminate play surfaces or articles.

FA 129: All arts and crafts materials used in the facility shall be nontoxic. There shall be no eating or drinking by children or staff during use of such materials. Use of old or donated materials with potentially harmful ingredients shall be prohibited.

FA 130: Poisonous or potentially harmful plants on the premises shall be inaccessible to children. All plants accessible to children shall be identified and checked by name with the local poison control center to determine safe use.

FA 131: The use of incense, moth crystals or moth balls, and chemical air fresheners that contain

ingredients on the Environmental Protection Agency's toxic chemicals lists and those not approved as safe by the state or local regulatory agency shall be prohibited. Contact the EPA Regional offices listed in the federal agency section of the telephone directory for assistance, or contact any nationally certified regional poison control center.

FA 132: Carpets made of nylon, orlon, wool and/or silk, and other materials that emit highly toxic fumes when they burn shall not be used.

FA 133: Areas that have been recently carpeted or paneled using an adhesive that may contain toxic materials shall be well ventilated and shall not be used by a facility for at least 7 days after such installation, or until there is no perceptible odor. Ambient testing in compliance with testing requirements of the Environmental Protection Agency shall be conducted if recommended by the local health department or building inspector before occupancy to ascertain that no unsafe levels of toxic substances (e.g., formaldehyde) resulting from the materials or their installation exist.

FA 134: Insulation or other materials that contain elements that may emit toxic substances (e.g., formaldehyde) over recommended levels in the child care environment shall not be used in facilities. If existing structures contain such materials, the facility shall be monitored regularly to ensure a safe environment as specified by the regulatory agency.

FA 135: Any surface painted before 1978 shall be tested for excessive lead levels.

a. In all centers, both exterior and interior surfaces covered by paint with lead levels of 0.06 percent and above and accessible to children shall be removed by a safe chemical or physical means or made inaccessible to children, regardless of the condition of the surface.
b. In large and small family child care homes, flaking or deteriorating lead based paint on interior or exterior surfaces, equipment, or toys accessible to preschool age children shall be removed or abated according to health department regulations.
c. Where lead paint is removed, the surface shall be refinished with lead-free paint or nontoxic material. Sanding, scraping, or burning of high-lead surfaces shall be prohibited.

FA 136: No paint containing lead in excess of 0.06 percent shall be used when surfaces are repaired or when any new surfaces accessible to children are painted.

FA 137: Construction, remodeling, or alterations of structures during child care operations shall be done in such a manner as to prevent hazards or unsafe conditions (e.g., fumes, dust, safety hazards).

Research Review/Gap Analysis:

Pediatric professionals are increasingly concerned that a number of developmental problems and illnesses are caused or exacerbated by noxious gases, particulates of metals and fibers and radiation (Noyes, 1987). As listed by Aronson (1988), many potentially toxic materials can be found in child care centers, such as pesticides, art materials, cleaning agents, fuel by-products, cigarette smoke, building materials, improperly fired ceramics, and ground soil. Aronson (1988) presents a concise summary of immediate reactions as well as long term problems associated with chemical exposure.

Children differ from adults in important physiological and behavioral ways that affect the young child’s susceptibility and vulnerability to environmental hazards, including higher rates of oxygen consumption and metabolism, differences in body composition, developing body systems/organs (such that disruption of development may cause severe damage), and behavioral differences (Gratz & Boulton, 1992).

Risk cannot be entirely eliminated in any environment, but it can be significantly reduced. A number of specific resources (Aronson, 1988; Greenspan, 1991; Gursky, 1991; Noyes, 1987) provide excellent recommendations to manage environmental hazards. The prevention and management of environmental hazards in the child care center is possible with attention to the following: knowing the composition of building materials and products used within the center, watching for and eliminating hazards regularly, being familiar with the local health department, finding out who can answer questions and asking them frequently, and using common sense. Following these suggestions will help to decrease the potential risks for children in child care settings.

Summary Table:

Citation: Li, Hsu, & Tai (1997), Indoor pollution and sick building syndrome symptoms among workers in day-care centers, *Archives of Environmental Health.* 52(3):200-7.

Summary: In this study, the authors investigated indoor air quality and symptoms of respiratory illness in 264 nursing workers at 28 day care centers in Taipei. Geometric mean concentrations of indoor and outdoor bacteria were 735 colony-forming units in air (CFU/m3) and 384 CFU/m3, respectively. In addition, geometric mean concentrations of indoor and outdoor fungi were 1,212 CFU/m3 and 1,032 CFU/m3, respectively. Aspergillus, Cladosporium, and Penicillium-microfungi that occurred most commonly-were found indoors and outdoors. Geometric mean concentrations of house dust mite allergens, Der p I and Der p V, were 58 ng/g dust and 14 ng/g dust, respectively. In addition, the observed high prevalence of dampness or mold problems in the day-care centers indicated that dampness was very common in this subtropical region. The authors found a significant relationship between dampness and work-related sick building syndrome in the day-care-center workers. Furthermore, concentrations of fungi were lower in the day care centers equipped with air conditioners/air cleaners than in centers that lacked such equipment. Also, Aspergillus was associated strongly with work-related sick building syndrome in the day-care-center workers.

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Citation: Weismann, Dusdieker, Cherryholmes, Hausler, & Dungy (1995), Elevated environmental lead levels in a day care setting, *Archives of Pediatrics & Adolescent Medicine.* 149(8):878-81.

Summary: To determine the risk of lead poisoning among children enrolled in day care centers with elevated environmental lead burdens. Six day care centers on properties owned by a major state-supported university. One hundred fifty-five of 234 eligible children (mean age, 4.8 years) enrolled in these centers were screened by questionnaire for risk factors of lead exposures. Blood samples for lead levels were also obtained. Observations of day care activities relative to lead exposure risks were recorded. Analyses of lead levels in paint, dust, and/or soil samples at the six centers were obtained. Prevalence of elevated blood lead levels and associated behavioral risk factors for lead exposure in children attending day care centers. Elevated levels of lead in paint (2.4% to 40% lead) were present in all day care facilities. Three day care centers had elevated lead levels in windowsill dust (62,000 to 180,000 micrograms [corrected] of lead per square meter) or soil (530 to 1100 mg of lead per kilogram): Questionnaires documented low risk for lead exposure to children in the home environments. Direct observations in the day care setting revealed optimal supervision and hygiene of the children. Blood lead levels were less than 0.5 mumol/L (10 micrograms/dL) in all but one of the 155 children screened. Children attending day care centers with high environmental lead burdens need further documentation of blood lead levels, at-risk behaviors, and lead exposure risks in the home environments as an adjunct to the instigation of lead abatement procedures at the day care centers.

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Citation: Wolf & Karmaus (1995), Effects of inhalative exposure to dioxins in wood preservatives on cell-mediated immunity in day-care center teachers, *Environmental Research.* 68(2):96-105.

Summary: The study investigated the effects of chronic inhalative low-level exposure to dioxins in day-care centers containing wood treated with preservatives on (1) the number of peripheral CD4 and CD8 cells and the CD4:CD8 ratio in peripheral blood and (2) the delayed-type hypersensitivity reaction of the skin (Multitest Mereux). The study population consisted of 221 exposed and 189 unexposed employees of day-care centers in or near Hamburg. A status of decreased skin test reagibility was operationalized as hypoergy I (score < 5 mm), hypoergy II (< or = 1 positive reaction), and anergy (no positive reaction). Taking the fading during post exposure time into account, a surrogate for the dioxin burden based on the concentration of dioxins in indoor air (measured using the 2,3,7,8-TCDD TEF followed by the Federal Republic of Germany) was modeled. No effect was found regarding the number of CD4 cells, CD8 cells, and CD4:CD8 ratio. However, some evidence for an increasing dose-response relationship between inhalative exposure to dioxins and the risk of hypoergy and anergy was found, both in the total study population and among subjects with a short post exposure time (< or = 6 months). Subjects with a short post exposure time and a dioxin burden 0.6 pg/m3 had a significantly higher risk of hypoergy than unexposed subjects (hypoergy I: OR = 9.51, 95% CI = 1.96-42.02; hypoergy II: OR = 2.92, 95% CI = 1.14-7.5). It is concluded that a suppressive effect of inhalative exposure to dioxins in wood preservatives on human cell-mediated immunity cannot be ruled out.

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Citation: Kaune et al. (1994), Development of a protocol for assessing time-weighted-average exposures of young children to power-frequency magnetic fields, *Bioelectromagnetics* . 15(1):33-51.

Summary: A study was carried out in 1990 to guide the development of a protocol for assessing residential exposures of children to time-weighted-average (TWA) power-frequency magnetic fields. The principal goal of this dosimetry study was to determine whether area (i.e., spot and/or 24 h) measurements of power-frequency magnetic fields in the residences and in the schools and day care centers of 29 children (4 months through 8 years of age) could be used to predict their measured personal 24-h exposures. TWA personal exposures, measured with AMEX-3D meters worn by subjects, were approximately log-normally distributed with both residential and nonresidential geometric means of 0.10 microT (1.0 mG). Between-subjects variability in residential personal exposure levels (geometric standard deviation of 2.4) was substantially greater than that observed for nonresidential personal exposure levels (1.4). The correlation between log-transformed residential and total personal exposure levels was 0.97. Time-weighted averages of the magnetic fields measured in children's bedrooms, family rooms, living rooms, and kitchens were highly correlated with residential personal exposure levels (r = 0.90). In general, magnetic field levels measured in schools and day care centers attended by subjects were smaller and less variable than measured residential fields and were only weakly correlated with measured nonresidential personal exposures. The final measurement protocol, which will be used in a large US study examining the relationship between childhood leukemia and exposure to magnetic fields, contains the following elements: normal- and low-power spot magnetic field measurements in bedrooms occupied by subjects during the five years prior to the date of diagnosis for cases or the corresponding date for controls; spot measurements under normal and low power-usage conditions at the centers of the kitchen and the family room; 24-h magnetic-field recordings near subjects' beds; and wire coding using the Wertheimer-Leeper method.

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Citation: Daneault, Beausoleil, & Messing (1992), Air quality during the winter in Quebec day-care centers, *American Journal of Public Health* . 82(3):432-4.

Summary: Over 90% of 91 day care centers in greater Montreal, Quebec exceeded 1000 ppm of CO2 during January through April 1989. Four variables were independent positive predictors of CO2 levels: the density of children in the center; presence of electric heating; absence of a ventilation system; and building age. High levels of CO2 are associated with respiratory tract and other symptoms. Clear standards and inspection policies should be established for day care center air quality.

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Citation: Gunn, Pinsky, Sacks, & Schonberger (1991), Injuries and poisonings in out-of-home child care and home care, *American Journal of Diseases of Children*. 145(7):779-81.

Summary: As part of a national telephone survey regarding health events associated with out-of-home child care, data regarding poisonings and injuries were collected. Of 171 reported poisonings, none occurred during out-of-home child care. The rate of injury during out-of-home child care was 1.69 per 100,000 child-hours compared with 2.66 for home care. Overall injury rates were slightly higher for children who attended out-of-home child care than for those who do not. This occurred because children who attended out-of-home child care had a higher injury rate during home care than did the children who did not attend out-of-home child care at all. Although out-of-home child care may carry an increased risk of infectious disease relative to home care, it does not appear to carry an increased risk of injury and, in fact, may confer a lower risk.

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Citation: General Accounting Office (1994), *Toxic Substances: The Extent of Lead Hazards in Child Care Facilities and Schools Is Unknown. Report to the Chairman, Subcommittee on Health and the Environment, Committee on Energy and Commerce, House of Representatives* .

Summary: This report by the U.S. General Accounting Office discusses federal, state, and local programs and activities to inspect for and address lead hazards in the nation's child care facilities and schools, and existing information on the extent and treatment of lead hazards in these facilities and schools. Federal agencies conduct numerous activities to address lead hazards in general, but only a few federal agencies have limited programs that deal with lead hazards in child care facilities and schools. Individual state and local agencies differ considerably in the extent to which they inspect for and remove lead hazards in such institutions. While the majority of the 57 school districts and 16 state child care agencies surveyed conducted some tests for lead hazards, these tests were conducted on only a limited basis. Therefore, sufficient information is not available for assessing the full extent of lead hazards in the nation's child care facilities and schools and for assessing how adequately these hazards are being addressed. Three appendixes provide survey data on school district lead hazard inspections; the objectives, scope, and methodology of the survey; and a list of major contributors to the report.

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Citation: Gratz & Boulton (1993), Taking Care of Kids: A Director's Concerns about Environmental Hazards, *Day Care & Early Education*, 21(2):29-31.

Summary: Early childhood center directors need to be aware of young children's susceptibilities to environmental hazards and do what they can to eliminate or mitigate environmental and safety problems

in and around centers. Directors should use common sense, know composition of products used in the center, watch for and eliminate hazards regularly, and ask their local health department for advice.

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Citation: Gratz & Boulton (1993), Environmental Hazards in the Child Care Center, *Early Child Development & Care*, 87, 29-38.

Summary: Presents research findings regarding the susceptibility of young children to various indoor environmental pollutants including cigarette smoke, heating and cooking equipment, art supplies, lead, and asbestos. Discusses assessment, management, and prevention of environmental hazards to provide guidelines for achieving a safe child care.

Additional Resources:

Children's Environmental Health Network
110 Maryland Avenue NE, Suite 511
Washington, DC 20002
Phone: 202-543-4033
http://www.cehn.org/

Environmental Protection Agency (EPA)
401 M Street SW
Washington, DC 20460-0003
Phone: 202-260-2090
http://www.epa.gov

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Handwashing/Diapering Indicator

Out of the 13 indicators, this indicator provided the greatest guidance material for compliance with state regulations. The CFOC standards are very specific and should be used by state regulators in the development or revision of state child care regulations. Eight standards are listed for this indicator.

CFOC Standards (1992):

HP 029: Staff and children shall wash their hands at least at the following times, and whenever hands are contaminated with body fluids:

a. Before food preparation, handling, or serving.
b. After toileting or changing diapers.
c. After assisting a child with toilet use.
d. Before handling food.
e. Before any food service activity (including setting the table).
f. Before and after eating meals or snacks.
g. After handling pets or other animals.

HP 030: Children and staff shall wash and scrub their hands for at least 10 seconds with soap and warm

running water.

HP 031: The facility shall ensure that staff and children are instructed in, and monitored on, the use of running water, soap, and single-use or disposable towels in handwashing as specified in this chapter.

FA 144: Toilets and sinks, easily accessible for use and supervision, shall be provided in the following ratios: toilets, urinals, and hand sinks shall be apportioned at a ratio of 1:10 for toddlers and preschool-age children and 1:15 for school-age children. Maximum toilet height shall be 11 inches and maximum hand sink height shall be 22 inches. Urinals shall not exceed 30 percent of the total required toilet fixtures. When the number of children in the ratio is exceeded by one, an additional fixture shall be required. These numbers shall be subject to the following minimums:

a. A minimum of one sink and one flush toilet for 10 or fewer toddlers and pre-school age children using toilets.
b. A minimum of one sink and one flush toilet for 15 or fewer school age children using toilets.
c. A minimum of two sinks and two flush toilets for 16 to 30 children using toilets.
d. A minimum of one sink and one flush toilet for each additional 15 children.

FA 154: The changing area shall never be located in food preparation areas and shall never be used for temporary placement or serving of food.

FA 156: Changing tables shall have impervious, nonabsorbent surfaces. Tables shall be sturdy, shall be adult height, and shall be equipped with railings. Safety straps on changing tables shall not be used.

FA 158: If cloth diapers are used, a toilet shall be easily accessible so that waste contents may be disposed of by dumping before placing the diapers in the waste receptacle.

FA 159: Conveniently located, washable, plastic lined, tightly covered receptacles, operated by a foot pedal, and shall be provided for soiled burping cloths and linen.

Research Review/Gap Analysis:

Handwashing is the single most effective way to interrupt the transmission of infectious diseases that are spread through the fecal-oral route (diarrheal diseases and hepatitis A) and through contact with infected urine and saliva (CMV). Two key points to note about handwashing are 1) rubbing hands together thoroughly with soap creates a rich lather that helps to loosen germs; and 2) rinsing hands thoroughly with running water rinses germs off the skin. Because babies and toddlers love water, it isn't difficult to teach them to wash correctly (Kendall & Moukaddem, 1993). Washing hands takes time and energy, a fact that should be acknowledged if hand washing is to be successfully implemented. Facilities that are not conducive to convenient hand washing for adults and children can discourage this healthy practice. Caregivers who are frequently interrupted with spontaneous demands on their time and energy are likely to become distracted and forget, or be unable to wash hands as needed. But the consequences of failing to wash hands frequently can be serious. Adults and children may contract hepatitis A unless scrupulous hand washing procedures are followed (including washing children 's hands that may have strayed into diapers) and diapering areas are carefully disinfected after each use. When gloves are used, it is critically important that staff wear clean gloves to prevent the spread of disease.

Wearing diapers and being younger than 3 years of age were associated with a higher frequency of respiratory illness, according to a study (Sauver, Khurana, Kao & Foxman, 1998) where hygiene practices in licensed group child care and family child care were described in association with hand

washing and prevalence of respiratory illnesses. Children attending family child care had more respiratory illness than children attending group child care homes. Infrequent washing of children's or providers hands after diapering, before meals, and before food preparation was significantly associated with a higher frequency of respiratory illness. Use of shared cloth towels instead of individual paper towels and washing of sleeping mats less than once a week were also associated with a higher frequency of respiratory illness. These findings underscore the importance of hand washing in reducing the spread of disease in child care settings.

Several other studies (May 1993; Niffenegger, 1997; Mohle-Boetani, Stapleton, Finger, Bean, Poundstone, Blake, & Griffin, 1995; Starr, 1995) clearly demonstrate that hand washing has been recognized as one way to manage the spread of infectious diseases in child care centers. Poor hand hygiene among school children can promote the spread of infection in the school. Cold sores (Herpes simplex), conjunctivitis and gastroenteritis are common infections spread in schools. In other studies (Holaday, Waugh, Moukaddem, West, & Harshman, 1995a, 1995b) an analysis was conducted comparing cloth and paper diapers. In these studies, no significant difference in the frequency or the intensity of fecal contamination in child care centers was found. One significant area for follow up study is to control microbial contamination in child care centers focusing on effective ways of reducing contamination of sink faucets, hands of the caregivers, and hands of the children.

Although the association between hand washing and the spread of infectious disease is clearly documented and many training and information modules have been developed, proper hand washing is not commonly practiced in many child care programs, according to anecdotal evidence from *Healthy Child Care America* and to this author's experience. Child care programs must be provided with continuous training, technical assistance, and mentoring assistance. Also developing and implementing monitoring systems to make certain that policies and routines are actually carried out is another needed area for research.

Summary Table:

Citation: Laborde et al. (1993), Effect of fecal contamination on diarrheal illness rates in day-care centers, *American Journal of Epidemiology*, 138(4):243-55.

Summary: Contact spread of enteropathogens in day care centers is supported by the recovery (presence vs. absence) of fecal coliforms from hands and day care center fomites. This prospective study was conducted to determine what, if any, quantitative measures of fecal coliforms predict the risk of diarrhea among day-care center attendees. Diarrheal illness without concomitant respiratory symptoms was monitored among 221 children aged less than 3 years in 37 classrooms (24 day-care centers) through biweekly parental telephone interviews from October 1988 to May 1989 in Cumberland County, North Carolina. The risk of diarrhea was expressed as new episodes/classroom-fortnight. Contamination was expressed as the log10 fecal coliform count per unit of surface area, per toy, and per child and staff hands. Significant predictors of diarrheal risk were any hand contamination ($p = 0.003$) and the number of contaminated moist sites (hands, faucets, and sinks) ($p = 0.006$). After adjusting for the child/staff ratio using weighted multiple regression, the authors found that classrooms with either any hand contamination ($p = 0.0015$) or contamination on all moist sites ($p = 0.015$) had a significant twofold increased rate of diarrhea compared with classrooms without contamination. This was the first study to demonstrate an increased risk of diarrhea associated with fecal contamination and the frequent sink contamination in day-care centers.

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Citation: Mohle-Boetani et al. (1999), Viral meningitis in child care center staff and parents: an outbreak of echovirus 30 infections, *Public Health Reports*, 114(3):249-56.

Summary: A report of five cases of viral meningitis among adults with children enrolled in a child care center prompted an investigation of risk factors for viral transmission from children to adult household members. To determine recent echovirus 30 (E30) infections, the authors conducted a serologic survey. To determine risk factors for infection among adult household members, they conducted a retrospective cohort study using written questionnaires. Recent E30 infections were found in 84% of children tested, 57% of adult household members tested, and 47% of staff members tested. Infected adults were more likely than infected children to have clinical meningitis. Among adult household members, changing diapers was a risk factor for recent infection. Women who changed more than or equal to 90 diapers per month had a higher infection rate than women who changed fewer diapers; in contrast, men who changed more than or equal to 90 diapers per month had a lower infection rate than men who changed fewer diapers. Handwashing was protective: there was a negative correlation between handwashing after diaper changes and E30 infection among adults with infected children in diapers. Because child care centers can be a source of enteroviral infections among adult household members, adults with viral meningitis should be questioned about their children's day care or preschool attendance. The importance of handwashing should be stressed to adults with children in day care.

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Citation: St. Sauver, Khurana, Kao, & Foxman (1998), Hygienic practices and acute respiratory illness in family and group day care homes, *Public Health Reports*, 113(6):544-51.

Summary: To describe hygiene practices in licensed group day care and family day care homes and the association between these practices and the prevalence of respiratory illnesses in the children in attendance. Self-administered surveys were mailed to 137 group and 204 family day care providers. Wearing diapers and being younger than age three were associated with a higher frequency of respiratory illness. Children attending family day care homes had more respiratory illness than children attending group day care homes. Infrequent washing of children's or providers' hands after nose wiping, after diapering, before meals, and before food preparation was significantly associated with a higher frequency of respiratory illness. Use of shared cloth towels instead of individual paper towels and washing of sleeping mats less than once a week were also associated with a higher frequency of respiratory illness. The findings underscore the importance of handwashing and other hygiene practices in reducing the spread of disease in day care settings.

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Citation: Van, Wun, Morrow, & Pickering (1991), The effect of diaper type and over clothing on fecal contamination in day-care centers, *Journal of the American Medical Association* , 265(14):1840-4.

Summary: Fecal coliform contamination of environmental surfaces and hands in the day-care center is common. This study evaluated the effect of two diaper types on fecal contamination. Ten rooms in four day-care centers containing 141 children were studied in a prospective, randomized, crossover study. A total of 2946 samples were cultured during the nine-week study. Fecal coliforms were isolated from 307 inanimate objects (15%), 73 toy balls (46%), and 131 hands (17%). The number of contaminated inanimate objects was significantly less in rooms where paper diapers were worn when compared with that in rooms where double cloth diapers with plastic overpants were worn and in rooms where clothes were worn over diapers. Inanimate object cultures had more contamination in rooms in which diarrhea had occurred. Containment of feces by overclothes and diaper type may be important in decreasing

transmission of enteric pathogens in day-care environments

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Citation: Niffenegger (1997), Proper handwashing promotes wellness in child care, *Journal of Pediatric Health Care,* 11(1):26-31.

Summary: The purpose was determine the effectiveness of an instructional program on handwashing. The hypothesis stated that an instructional program on germs and handwashing in child care could significantly reduce the spread of infectious diseases in the test center. A longitudinal study was conducted in a field setting with a test group and a control group of 3- to 5-year-old children and their teachers in two similar child care settings. For 21 weeks illnesses and symptoms were assessed with a health assessment checklist. The test group received a developmentally appropriate instructional program on germs and handwashing. The teachers in the test group attended workshops on infectious diseases and handwashing. The control group maintained their usual handwashing procedures. At weeks 1 through 11 benchmark data were collected. At weeks 12 through 21, peak cold and flu season, the test group had significantly fewer colds than the control group (chi-squared analysis, 4.338, 1 df, $p<.05$); thus the hypothesis was confirmed. Handwashing has been recognized as one way to manage the spread of infectious diseases in child care centers. Handwashing helped to reduce colds at the test center where frequent and proper handwashing practices were incorporated into the curriculum through an intervention program.

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Citation: Mohle-Boetani et al. (1995), Community wide shigellosis: control of an outbreak and risk factors in child day-care centers, *American Journal of Public Health* , 85(6):812-6.

Summary: The study's objectives were to assess 1) control of a community outbreak of shigellosis through the promotion of handwashing, 2) risk factors in day-care centers, and 3) shigellosis attributable to attendance at a day-care center. Methods. In 1991, an outbreak of Shigella sonnei infections occurred in Lexington-Fayette County, Ky; 14 licensed child day-care centers were involved. Community wide promotion of hand washing was instituted along with diarrhea surveillance. A case-control study compared day care centers that had confirmed cases of shigellosis with centers that had none. A family transmission study determined those cases attributable to attendance at day-care centers. The outbreak abated three weeks after the interventions' initiation. Day care centers with outbreaks were more likely than those with no cases to have a food handler who changed diapers and to provide transportation for children from their homes to the center. These centers also had a higher toddler-to-toilet ratio than control centers (21 vs. 12). In 58% of families with shigellosis, the first person with diarrhea during the outbreak was a child younger than 6 years; 92% of diarrheal illnesses among these children were attributable to day-care attendance. Community involvement in increasing hand washing most likely resulted in control of this shigellosis outbreak. Diarrhea prevention strategies in day-care centers could prevent substantial community wide disease.

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Citation: Holaday et al. (1995), Fecal contamination in child day care centers: cloth vs. paper diapers, *American Journal of Public Health* , 85(1):30-3.

Summary: Cloth diapers with front closure and all-in-one design were compared with paper diapers containing absorbent gel material for their influence on fecal contamination of the environment in

licensed child day care centers. One infant room and two toddler rooms in each of four day care centers were monitored for the presence of fecal bacteria. Microbial samples were taken from the play/sleep area, the diaper-changing area, and the hands of the caregivers and the children. Sampling was done twice weekly for two 4-week periods. Each center used either cloth or paper diapers during the first period, changing to the other diaper type during the second period. A total of 1722 samples were cultured, 881 during the first 4 weeks and 841 during the second 4 weeks. The frequency of isolation of fecal organisms ranged from a low of 12% of the total bacteria isolates at a center using cloth diapers, to highs of 46% and 45%, respectively, at a center using first paper and then cloth diapers. Sink faucets and the hands of the caregivers and the children were often contaminated. Analysis of the results of comparisons between cloth and paper diapers showed no significant difference in the frequency ($F=.380$, $P < .535$) or the intensity of fecal contamination in child day care centers.

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Citation: Holaday et al. (1995), Diaper type and fecal contamination in child day care, *Journal of Pediatric Health Care* , 9(2):67-74.

Summary: In this study, modern all-in-one, front closure, reusable cloth diapers were compared with single-use, disposable paper diapers for their effect on fecal contamination in the child day care environment. Four licensed child day care centers were surveyed from which 1722 bacterial samples were cultured. The frequency of isolation of fecal organisms ranged from a low of 12% of the total bacterial isolates at a center using cloth diapers to a high of 46% and 45%, respectively, obtained at a center using first paper and then cloth diapers. Diaper type, cloth versus paper, when the method of application and the handling are made comparable, showed no significant difference in the frequency or the intensity of fecal contamination in child day care centers, as measured in the play/sleep area, the diaper change area, or on the hands of the care givers and children. Future studies to control microbial contamination in child day care centers should focus on effective ways of reducing contamination of sink faucets, hands of the caregivers, and hands of the children.

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Citation: Benfield (1991), *The effect of a teaching program on infection prevention behavior in day care center staff members* , The Catholic University of America.

Summary: By 1995 two-thirds of preschool children in the United States will have mothers in the workforce, and many of these children will be cared for in group day care centers. Because of immature immunological systems and hand-to-mouth behavior, young children in day care are at risk for transmission of potentially serious infectious illnesses. Studies describing mechanisms of infections among children in day care consistently recommend scrupulous infection prevention practices, emphasizing handwashing. This quasi-experimental research measured the effectiveness of an infection prevention program on the knowledge level and infection prevention behavior of 71 staff members from six large centers. Centers were assigned to treatment or control status by coin toss. Three treatment centers were taught an infection prevention program by the researcher, consisting of a slide/tape presentation and two handwashing reinforcement sessions presented at weekly intervals. Three control centers were pre- and post-tested but did not receive the program until all data were collected. Program design was based on Singer's model of psychomotor learning. Three instruments measured program effectiveness. A knowledge test was administered before and after the program. The Handwashing Observation Scale was administered once before and once after the program, and immediately following each of the handwashing reinforcements. The researcher and an assistant used a checklist to observe and record infection prevention behaviors. Staff were observed at intervals three times before and three times after the program. The program had a significant impact on knowledge and behavior. Repeated

measures ANOVA revealed that scores of the treatment group were significantly higher than control on the two behavioral measurements following the program. ANCOVA performed on knowledge test scores indicated a significant increase in both treatment and control groups, but treatment group increase was significantly higher. High infection rates in day care centers and a serious need for information related to infection prevention are well documented in the literature. Staff correctly performed infection prevention behaviors about 35% of the time before the program, increasing to about 75% after the program. Similar programs should be developed and tested at various types of child day care centers.

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Citation: Petri et al. (1995), *Evaluating a Hygiene Education Program for Child Care Workers* .

Summary: Children, parents, and child caregivers are vulnerable to several infectious diseases as a result of contact with child care centers. This pilot program, implemented in a rural county in a southeastern state, was designed to enhance knowledge and skills related to improved hygiene practices in a child care setting. The target audience for the training was caregivers and parents of children attending seven centers housed within public schools and churches in a rural, predominantly African American county. Participating were 22 staff and eight parents. The training took approximately one hour and consisted of four components: 1) a videotape, "The ABCs of Clean," and discussion of hygiene practices; 2) a handout on preventing contact infections through hand washing, personal hygiene, and sanitizing eating utensils and surfaces; 3) presentation and discussion of the "Hooray for Hand Washing Teachers' Packet," including several educational materials; and 4) demonstration and practice teaching of handwashing. Evaluation data were obtained through a mail questionnaire and a follow-up survey. The findings indicated that participants responded positively to the training, with 92 percent saying that they would teach hand washing to their children. The follow-up survey revealed that the instructional resources were useful in daily lessons, participants were practicing proper hand washing with their children more often, and half of the participants had sent at least two of the flyers home to parents. Participants reported that children were washing their hands noticeably more often, at appropriate times, and for a longer length of time at each washing.

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Citation: Starr (1996), Breaking the Chain: Handwashing and Infection Control. *Early Childhood News* , 8(3):29-31.

Summary: Highlights the importance of each child-care facility having an explicit hand-washing policy that includes caregivers and teachers as well as children. Outlines a specific hand-washing technique and gives a variety of practical suggestions for promoting good hygiene and good health.

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Citation: Fiene (1994), *Measuring Child Care Quality* , paper presented at the International Conference on Child Day Care Health: Science, Prevention and Practice, Atlanta, Georgia.

Summary: Child care quality is not a single dimension, but rather a multidimensional characteristic of programs that support the family in its child-rearing role and programs in which children thrive developmentally, socially, cognitively, physically, and emotionally. At the regulatory and accreditation level, approaches to quality focus on group size, adult-child ratios, and caregiver training and experience. Research has identified several other indices of quality child care that predict developmental and health outcomes, for example, the degree to which children are properly immunized or handwashing

routines are followed. In a multidimensional approach to measuring quality, it is appropriate that providers, staff, and parents engage in self-assessment as a monitoring tool. However, the best means for collecting data is probably through observation followed by record reviews. Family influence may have a confounding effect on the measurement of the quality of child care. Research from an international perspective shows that programs with a high global assessment of quality care are associated with children who have greater social competence, higher levels of language development, higher developmental levels of play, better ability to regulate their behavior, and greater compliance with adults' wishes. Global assessment of quality is measured using a combination of discrete characteristics or a global rating scale such as the Infant-Toddler Environment Rating Scale.

Additional Resources:

American Academy of Pediatrics
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Centers for Disease Control
National Center for Infectious Disease
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Conclusion

This review incorporates the latest research into an empirically demonstrated list of key regulatory indicators that statistically predict positive outcomes for young children. This review offers the reader substantial evidence regarding the critical importance of these key indicators. The research literature over the past 20 years has demonstrated that these indicators accomplish two things. One, they statistically predict overall compliance with regulations in particular states. And two, a significant relationship exists between compliance with these indicators and positive outcomes for young children (Fiene, 1994).

These key indicators support and embrace the overall research literature related to child care quality. Many of the indicators have been identified as key surrogates of child care quality that have an impact on young children and as being a reliable tool for identifying high compliant versus low compliant programs. The indicators identified in this research brief are regulatory predictors that have the discriminatory ability to identify differential compliance in child care programs. In other words, these indicators are always in compliance with high compliant programs and always out of compliance with low compliant programs.

In the research review/gaps section of this research brief, several areas have been identified as areas that need to be considered for further research. Some of the key gaps in the research literature that need further exploration and should guide the establishment of a national research agenda include:

1. The health care needs of staff;
2. The impact that different child:staff ratios and group sizes have on health-related issues;
3. Noncompliance with preschool children and how teachers react to these occurrences;
4. How children react to fire drill training;
5. Training effectiveness related to medication administration and emergency contact/planning;
6. The development of more effective monitoring systems for hand washing;

7. The accessibility and adequacy of child care training for staff.

The National Resource Center for Health and Safety in Child Care (NRC) is conducting a revision process for the *National Health and Safety Performance Standards for Child Care* . This second edition of the *Standards* , to be published by the American Academy of Pediatrics, the American Public Health Association, and the NRC in 2001, with support from the HRSA Maternal and Child Health Bureau, has undergone a rigorous review process. Ten technical panels, focusing on their areas of expertise, provided recommendations for revision that were merged into a single set of recommended standards. These standards were then widely reviewed by representatives of all stakeholders with an interest in child care, including parents. The final document will represent a consensus of the various disciplines involved with child care, with the largest contribution of factual content coming from experts in health and safety. This revision will help inform and update the field related to many of the key issues raised in this research brief. The information gained through the expert review of the standards will hopefully provide impetus to move the national research agenda forward in the areas of identified need.

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