

**Infectious Disease in Child Care Settings
Training Module
version 4**
(Last updated 4/23/13)

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NOTE TO TRAINER

This Training Module presents information on preventing and responding to infectious diseases in the child care setting. The Toolkit includes a Trainer’s Guide to leading training sessions, PowerPoint slides, and materials for participants’ packets. This Module also has an accompanying Narrated Slide Presentation, which can be accessed on the NTI Resources Website.

For more information about using the NTI materials, please read “Guidelines for Using the NTI Curriculum Materials,” available in the “Curriculum” section of the NTI Resources Website (accessed by entering your NTI username and password at <http://sakai.unc.edu>).

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LEARNING OBJECTIVES

After reading this Training Module, Trainers will be able to:

- Identify the types of infectious diseases documented in child care facilities
- Identify infectious diseases that show an increased incidence in child care facilities
- Describe patterns of occurrence of infectious disease in child care facilities
- Describe the consequences of increased incidence of infectious disease in child care facilities
- Identify modes of transmission of infectious disease most prevalent in child care facilities
- Identify factors that facilitate transmission of infectious disease in child care facilities
- Identify preventive measures, including immunizations, to reduce the spread of infectious disease in child care facilities
- Develop policies addressing how to prevent the spread of infectious disease in child care facilities, including general criteria for when to exclude sick children from the facility
- Describe the disease prevention benefits of out-of-home child care

INTRODUCTION: THE ROLE OF THE CCHC

The child care health consultant (CCHC) is in a position to assist child care caregivers/teachers, parents/guardians, health care practitioners, and public health officials in responding to occurrences of infectious disease. Three principal responsibilities of the CCHC in the area of disease prevention are assistance with:

- Policy development and implementation
- Education
- Resource and referral

An understanding of infectious diseases is critical to the development of policies in the child care setting that relate to handwashing, diapering, and other hygiene practices, as well as to when to exclude sick children from care and which diseases to report to local or state officials. Education plays a critical role in ensuring that these policies are appropriately implemented. The CCHC also plays an important role in making sure that child care caregivers/teachers and parents/guardians understand the current immunization schedule and recommendations for vaccinations. [Appendix G](#) The challenge for the CCHC is to increase child care caregivers/teachers' awareness of infectious diseases and to communicate this information in a way that they can understand and share with parents/guardians. Finally, the CCHC should have access to community professionals and resources that can assist with providing information, vaccinations, and assistance in preventing and handling disease outbreaks.

In order to perform these duties, the CCHC must understand the relationship between infectious diseases and child care facilities. The CCHC should be familiar with:

- The range of infectious diseases that have been documented in child care facilities
- The infectious diseases that show an increased incidence in this type of setting
- The patterns of occurrence of infectious diseases in child care and best prevention methods
- The consequences of higher incidence of infectious diseases in child care facilities
- The consequences of increased antibiotic use

These aspects of the infectious disease/child care relationship are described in the sections that follow. In addition to the topics discussed in this Module, the CCHC should be familiar with the NTI Module *Caring for Children Who Are Ill* which presents more specific details around exclusion criteria and policies, procedures and care arrangements for children who are ill.

CARING FOR OUR CHILDREN NATIONAL STANDARDS (3rd ed., 2011)

Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs, Third Edition (CFOC) is a set of 686 attainable standards that are intended for use by health care professionals, trainers, regulators, caregivers/teachers, academics and researchers, parents/guardians, and others “who work toward the goal of ensuring that all children from day one have the opportunity to grow and develop appropriately, to thrive in healthy and safe environments, and to develop healthy and safe behaviors that will last a lifetime” (*CFOC*, 3rd ed., 2011, p. xxi). These standards, supported by the Maternal and Child Health Bureau, were developed by the American Academy of Pediatrics, the American Public Health Association, and the National Resource Center for Health and Safety in Child Care and Early Education.

The following is a list of the standards relating to infectious disease in the child care environment, along with a short description and the page number in *CFOC* on which the standard can be found. All listed standards are referenced throughout this module.

[1.3.2.7](#) – Qualifications and Responsibilities for Health Advocates, p. 16

States that each facility should designate at least one administrator or staff person as the health advocate and lists training topics for this role

[2.1.2.4](#) - Separation of Infants and Toddlers from Older Children, p.59

States infants and toddlers younger than three years of age should be cared for in closed rooms that separates them from older children, except in small family child care homes with closed groups of mixed age children. In facilities caring for three or more children younger than three years of age, activities that bring children younger than three years of age in contact with older children should be prohibited, unless the younger children already have regular contact with the older children as part of a group.

[3.1.5.2](#) – Toothbrushes and Toothpaste, p. 102

Details how toothbrushes and toothpaste should be stored and handled in a child care facility.

[3.2.1.1](#) – Type of Diapers Worn, p.104

States that diapers worn by children should be able to contain urine and stool and minimize fecal contamination of children, caregivers/teachers, environmental surfaces, and objects in the child care setting.

[3.2.1.2](#) – Handling Cloth Diapers, p.105

Presents information on how to handle cloth diapers to avoid contamination.

[3.2.1.3](#) – Checking For the Need to Change Diapers, p.105

Provides details on when and how diapers should be checked to determine the need to be changed.

[3.2.1.4](#) – Diaper Changing Procedure, p.106

Details the eight step procedure for diaper changing.

[3.2.1.5](#) – Procedure for Changing Children’s Soiled Underwear/Pull-Ups and Clothing, p. 108
Details the seven step procedure for changing children’s soiled underwear/pull-ups and clothing.

[3.2.2.1](#) – Situations that Require Hand Hygiene, p. 110
Details when all staff, volunteers, and children should wash hands.

[3.2.2.2](#) – Handwashing Procedure, p.111
Describes the eight step procedure for proper handwashing.

[3.2.2.3](#) – Assisting Children with Hand Hygiene, p.112
Describes how caregivers/teachers should assist children with hand hygiene based on their age and physical abilities.

[3.2.2.4](#) – Training and Monitoring of Hand Hygiene, p.112
States that the program should ensure that staff members and children who are developmentally able to learn personal hygiene are instructed in, and monitored on performing the appropriate hand hygiene procedures.

[3.2.3.4](#) - Prevention of Exposure to Blood and Bodily Fluids, p.114
States that child care facilities should adopt the use of Standard Precautions developed for use in hospitals by The Centers for Disease Control and Prevention (CDC). The specific procedures for Standard Precautions are detailed in this standard.

[3.3.0.1](#) – Routine Cleaning, Sanitizing, and Disinfecting, p.116
Notes that a combination of frequent cleaning and when necessary, an application of a sanitizer or disinfectant is the best way to keep objects and surfaces in a child care setting as clean and free of pathogens as possible.

[3.3.0.2](#) – Cleaning and Sanitizing Toys, p.117
States that toys that cannot be cleaned and sanitized should not be used, and that toys contaminated with bodily fluids should be set aside until they are appropriately cleaned.

[3.3.0.3](#) – Cleaning and Sanitizing Objects Intended for the Mouth, p. 118
States that thermometers, pacifiers, teething toys, and similar objects should be cleaned, and reusable parts should be sanitized between uses.

[3.3.0.4](#) - Cleaning Individual Bedding, p. 118
States that all bedding should be washable and that bedding materials for one child should be kept separate from another child’s bedding.

[3.6.1.1](#) - Inclusion/Exclusion/Dismissal of Children, p.131
Explains the conditions/symptoms that do not require exclusion, key criteria for exclusion of children who are ill, temporary exclusion recommendations, procedures for a child who requires exclusion, and a list of reportable conditions.

[3.6.1.4](#) – Infectious Disease Outbreak Control, p. 136

States that during the course of an identified outbreak of any reportable illness at the facility, a child or staff member should be excluded if the health department official or primary care provider suspects that the child or staff member is contributing to transmission of the illness at the facility, is not adequately immunized when there is an outbreak of a vaccine preventable disease, or the circulating pathogen poses an increased risk to the individual.

[3.6.4.1](#) – Procedure for Parent/Guardian Notification About Exposure of Children to Infectious Disease, p.144

Lists seven topics that should be included in notification to parents/guardians about possible exposure of children to infectious disease.

[3.6.4.2](#) – Infectious Diseases that Require Parent/Guardian Notification, p.145

Lists eleven diseases or conditions about which the child care facility should, in cooperation with the child care regulatory authority and health department, inform parents/guardians if a child has been exposed.

[4.9.0.11](#) – Dishwashing in Centers, p.193

Details types of dishwasher appropriate for child care centers.

[4.9.0.12](#) – Dishwashing in Small and Large Family Child Care Homes, p.194

Details types of dishwasher appropriate for small and large family child care homes.

[4.9.0.13](#) – Method for Washing Dishes by Hand, p.194

Details appropriate methods for washing dishes by hand if the facility does not use a dishwasher.

[5.2.1.1](#) – Fresh Air, p.211

States that as much fresh outdoor air as possible should be provided in rooms occupied by children.

[5.2.1.2](#) – Indoor Temperature, p.212

Details the appropriate indoor temperature range that should be maintained seasonally.

[5.2.1.3](#) – Heating and Ventilation Equipment Inspection and Maintenance, p.212

States that all heating and ventilation equipment should be inspected and cleaned before each cooling and heating season.

[5.2.1.4](#) – Ventilation When Using Art Materials, p.213

States that areas where arts and crafts activities are conducted should be well-ventilated.

[5.2.1.7](#) – Electric Fans, p.214

States that electric fans, if used, should bear the safety certification mark of a nationally recognized testing laboratory and be inaccessible to children (including their cords).

[5.2.1.8](#) – Maintenance of Air Filters, p.214

States that filters in forced-air heating and cooling system equipment should be checked and cleaned or replaced according to the manufacturer's instructions on a regular basis.

[5.2.7.4](#) - Containment of Soiled Diapers, p.226

Details the protocol of how to store soiled diapers at a facility.

[5.2.9.1](#) - Use and Storage of Toxic Substances, p.228

Details what items should be used as recommended by the manufacturer and should be stored in the original labeled containers. Specifies where and how these items should be stored to avoid contaminating play and food surfaces.

[5.4.1.2](#) - Location of Toilets and Privacy Issues, p.245

States that toilets should be located in rooms separate from those used for cooking or eating and cooking areas and that an adult must accompany a child to the bathroom in certain circumstances.

[5.4.1.6](#) - Ratios of Toilets, Urinals and Hand Sinks to Children, p.246

Details minimum ratios for toilets and hand sinks based on child's age and group size.

[5.4.1.7](#) – Toilet Learning/Training Equipment, p.246

Describes the appropriate equipment that should be used for toilet learning.

[5.4.1.10](#) - Handwashing Sinks, p.247

States that handwashing sinks should be accessible without barriers to each child area. Details what each sink should be equipped with for users.

[5.4.2.4](#) – Use, Location, and Setup of Diaper Changing Areas, p.249

States that infants and toddlers should be diapered only in the diaper changing area, and provides information on the specific location and setup of this area.

[5.4.2.6](#) – Maintenance of Changing Tables, p. 250

Details how to properly maintain changing tables.

[6.2.4.1](#) - Sandboxes, p.274

Details requirements for sand play areas..

[7.2.0.1](#) - Immunization Documentation, p.297

States that child care facilities should require that all parents/guardians of children enrolled in child care provide written documentation of receipt of immunization appropriate for each child's age.

[7.2.0.2](#) - Unimmunized Children, p.298

States the documentation necessary if immunizations have not been administered because of a contraindication or the parents/guardians' religious or philosophical beliefs.

[7.2.0.3](#) - Immunizations of Caregivers/Teachers, p.299

States that caregivers/teachers should be current with all immunizations routines recommended for adults by the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC).

[7.3.1.2](#) – Informing Caregivers/Teachers of Group A Streptococcal (GAS) Infection, p.301
States that parents/guardians who become aware that their child is infected with group A streptococci (GAS), has strep throat, or has scarlet fever, should inform caregivers/teachers within twenty-four hours.

[7.3.2.1](#) – Immunization for *Haemophilus Influenzae* Type B (HIB), p.301
Highlights need for all children in a child care facility to receive age-appropriate immunizations with a *Haemophilus influenzae* type b (Hib) conjugate containing vaccine. Also states that children in child care who are not immunized or not age-appropriately immunized against invasive Hib disease should be excluded from care immediately if the child care facility has been notified of a documented case of an invasive Hib infection.

[7.3.2.2](#) – Informing Parents/Guardians of *Haemophilus Influenzae* Type B (HIB) Exposure, p. 302
States that the facility should inform parents/guardians of other children who attend the facility, after consultation with health department authorities, that their children may have been exposed to the Hib bacteria and may have risk of developing serious Hib disease if their child is unimmunized or incompletely immunized.

[7.3.2.3](#) – Informing Public Health Authorities of Invasive *Haemophilus Influenzae* Type B Cases, p.302
Highlights need for facilities to cooperate with health department officials in notifying parents/guardians of children who attend the facility about exposure to children with invasive Hib disease.

[7.3.3.1](#) – Influenza Immunizations for Children and Caregivers/Teachers, p. 303
States that the parent/guardian of each child six months of age and older should provide written documentation of current annual vaccination against influenza unless there is a medical contraindication or philosophical or religious objection.

[7.3.3.3](#) – Influenza Prevention Education, p. 303
Specifies what the child care facility should cover in their annual refresher training at the beginning of each influenza season.

[7.3.5.1](#) -- Recommended Control Measures for Invasive Meningococcal Infection in Child Care, p.305
Lists four steps to take upon identification of an individual with invasive meningococcal infection in the child care setting.

[7.3.5.2](#) – Informing Public Health Authorities of Meningococcal Infections, p.305
States that facilities should cooperate with their local or state health department officials in notifying parents/guardians of children who attend the facility about exposures to children with invasive meningococcal infections.

[7.3.7.1](#) – Informing Public Health Authorities of Pertussis Cases, p.306

States that facilities should cooperate with their local or state health department officials in notifying parents/guardians of children who attend the facility about exposures to children or adults with pertussis.

[7.3.7.2](#) – Prophylactic Treatment for Pertussis, p.306

Outlines steps to take for a known or suspected case of pertussis in the child care facility, appropriate booster shots and monitoring activities.

[7.3.9.1](#) – Immunization with *Streptococcus Pneumoniae* Conjugate Vaccine (PCV13), p.308

Outlines recommended vaccines for *Streptococcus Pneumoniae* Conjugate based on developmental level and special health care need.

[7.3.9.2](#) – Informing Public Health Authorities of Invasive *Streptococcus Pneumoniae*, p.309

States that local and/or state public health authorities should be notified about cases of invasive *S. pneumoniae* infections involving: children less than five years of age, caregivers/teachers in the child care setting, or drug resistant invasive *S. pneumoniae* disease in a person of any age.

[7.3.10.1](#) – Measures for Detection, Control and Reporting of Tuberculosis, p.309

States that facilities should collaborate with local or state health department officials to notify parents/guardians about potential exposures to people with tuberculosis disease. Also outlines guidance for screening activities and procedures to control transmission of tuberculosis.

[7.3.11.1](#) – Attendance of Children with Unspecified Respiratory Tract Infection, p.311

Outlines three specific criteria for the possible exclusion of children from the facility due to an unspecified respiratory tract infection. Also addresses the issue of inappropriate antibiotic use in child care enrollees.

[7.4.0.1](#) – Control of Enteric (Diarrheal) and Hepatitis A Virus (HAV) Infections, p.311

Lists eight procedures facilities should take to prevent and control infections of the gastrointestinal tract or hepatitis A.

[7.4.0.2](#) – Staff Education and Policies on Enteric (Diarrheal) and Hepatitis A Virus (HAV) Infections, p.313

Highlights the importance of adhering to four staff educational policies to prevent and control infections of the gastrointestinal tract (mainly diarrhea) and hepatitis A.

[7.4.0.3](#) – Disease Surveillance of Enteric (Diarrheal) and Hepatitis A Virus (HAV) Infections, p. 314

States that the child care facility should cooperate with local health authorities in notifying all staff and parents/guardians of other children who attend the facility of possible exposure to hepatitis A, and diarrheal agents.

[7.6.1.1](#) – Disease Recognition and Control of Hepatitis B Virus (HBV) Infection, p.321

Highlights the importance of facilities having written policies for the inclusion and exclusion of children known to be infected with hepatitis B virus (HBV) and for the immunization of all children with hepatitis B vaccine per the “Recommended Immunization Schedules” for children

and adolescents. Also states that children who carry HBV chronically and who have no behavioral or medical risk factors may be admitted to the facility without restrictions.

[7.6.1.3](#) – Staff Education on Prevention of Bloodborne Diseases, p.323

States that all caregivers/teachers should receive training at employment and annually thereafter as required by the Occupational Safety and Health Administration (OSHA) on how to prevent transmission of bloodborne diseases.

[7.6.1.4](#) – Informing Public Health Authorities of Hepatitis B Virus (HBV) Cases, p.323

Outlines that cases of acute HBV in any child or employee of a facility should be reported to the health department for determination of the need for further investigation or preventive measures.

[7.6.1.5](#) – Handling Injuries to a Hepatitis B Virus (HBV) Carrier, p.323

States that injuries that lead to bleeding by a hepatitis B virus (HBV) carrier child or adult should be handled promptly in the manner recommended for any such injury in any child or adult using Standard Precautions.

[7.6.2.1](#) – Infection Control Measures With Hepatitis C Virus (HCV), p.324

States that Standard Precautions, as outlined in Standard 3.2.3.4, should be followed to prevent infection with hepatitis C virus (HCV) infection.

[7.6.3.2](#) – Protecting HIV-Infected Children and Adults in Child Care, p.324

Outlines the importance of information regarding a child whose immune system does not function properly to prevent infection, whatever the cause, being made available to caregivers/teachers who need to know so they can reduce the likelihood of transmission of infection to the child.

[7.6.3.3](#) – Staff Education About Preventing Transmission of HIV Infection, p.325

States that caregivers/teachers should be knowledgeable about routes of transmission and about prevention of transmission of bloodborne pathogens, including HIV, and should practice measures recommended by the U.S. Public Health Service for prevention of transmission of these infections.

[7.7.1.1](#) – Staff Education and Policies on Cytomegalovirus (CMV), p.326

Lists four topic areas of information that should be provided to employees of facilities that employ women of childbearing age.

[7.7.2.1](#) – Disease Recognition and Control of Herpes Simplex Virus, p.327

States that children with herpetic gingivostomatitis, an infection of the mouth caused by the herpes simplex virus, who do not have control of oral secretions, should be excluded from child care. In addition, this standard lists four actions that caregivers/teachers with herpetic gingivostomatitis, cold sores, or herpes labialis should take to prevent transmission.

[7.7.4.1](#) – Staff and Parent/Guardian Notification About Varicella-Zoster (Chickenpox) Virus, p. 328

States that the child care facility should notify all staff members and parents/guardians when a case of chickenpox occurs, informing them of the greater likelihood of serious infection in susceptible adults, the potential for fetal damage if infection occurs during pregnancy, and the risk of severe varicella in children or adults with impaired immunity.

[7.8](#) – Interaction with State or Local Health Departments, p. 329

Discussion the importance of prompt reporting of infectious diseases.

[7.9](#) – Note to Reader on Judicious Use of Antibiotics, p. 329

Discusses the spread of antimicrobial resistance as an issue of concern to patients, parents/guardians, and health professionals

[Appendix E](#) - Child Care Staff Health Assessment, p. 413

This appendix is a form to be filled out by the employer and a health care provider.

[Appendix G](#) – Recommended Immunization Schedule for Persons Aged 0- through 6 Years – United States, 2011, p. 431

[Appendix H](#) – Recommended Adult Immunization Schedule, United States, 2011, p. 434

[Appendix J](#) – Selecting an Appropriate Sanitize or Disinfectant, p. 440

Presents the difference between a sanitizer and a disinfectant, and tips to safely prepare bleach solutions.

[Appendix K](#) – Routine Schedule for Cleaning, Sanitizing, and Disinfecting, p.442

Charts when and how often specific food areas, child care areas, toilet& diapering areas, and sleeping areas should be clean, disinfected, and/or sanitized.

WHAT THE CCHC SHOULD KNOW: INCIDENCE OF INFECTIOUS DISEASE IN CHILD CARE SETTINGS

Research indicates that high quality out-of-home child care produces lasting benefits to young children and their families (Ramey, et al., 2000). However, over the past several decades of research has also produced convincing evidence that children in child care facilities experience a higher incidence of common infectious diseases than children reared exclusively in their own homes (Brady, 2005). The risks of diarrheal and upper respiratory illnesses are greater in children in out-of-home care than those cared for at home (Lu et al., 2004). Moreover, the larger the size of the center, the greater the risk of introduction of a community-acquired disease into the facility (Brady, 2005). Also, out-of-home child care has been found to constitute a major risk factor for more severe diseases, such as *Streptococcus pneumoniae* and *H. influenzae* type b (Huskins, 2000). *Streptococcus pneumoniae* is now the leading cause of invasive bacterial disease in young children (O'Brien, 2009). The development of better immunizations over the past 10 years has impacted the incidence of these diseases, but they are still widespread.

Consider the following examples of research results:

- Throughout the United States, children in child care facilities had a significantly higher incidence of otitis media, upper respiratory infections, and gastrointestinal illnesses than children reared in their own homes during the first two years. Moreover, children in center-based care showed a higher rate of otitis media and upper respiratory infections than children in family child care (National Institute of Child Health and Human Development Early Child Care Research Network [NICHD], 2001).
- Children ages three to five years in child care facilities were significantly more likely to have a nightly cough and nasal symptoms (blocked or runny nose) without a common cold than children in home care (Nafstad, Fagen, Øie, Magnus, and Jaakkola, 1999).
- Children ages birth to 1 ½ years and receiving Medicaid were more than three times as likely to develop upper respiratory infections compared to children cared for at home (Lu et al, 2004).
- Children in child care were significantly more likely to use antibiotics for mild episodes of diarrheal illnesses and for mild and severe episodes of upper respiratory infections than children in home care (Lu and Samuels, 2001).

Infectious Diseases Documented In Children and Adults in Child Care Settings

The variety of infectious diseases documented in children and/or adult staff in out-of-home child care programs parallels the list of childhood infectious diseases in general (Huskins, 2000). What is important for the CCHC to know is that children in child care do not appear to be exempt from any infectious childhood diseases, and *any* infectious disease has the propensity to spread in child care facilities.

The Incidence of Infectious Disease among Children in Child Care Facilities

Table 1 below lists diseases that have been demonstrated to occur with greater frequency among children attending out-of-home care versus children who are cared for in their own homes. It is noteworthy that these diseases are not unusual or in any way unique to child care. Rather, they are common infectious diseases of childhood that occur with greater frequency in the child care setting than among children reared at home. Moreover, the

incidence of some infections associated with child care, such as otitis media and *giardiasis*, are increasing in the general population (CDC, 1996). Some researchers have suggested that this general increase is due to the increasing numbers of children attending out-of-home child care (Brady, 2005).

Table 2: Infectious Diseases Associated with Out-of-Home Child Care

Type of Disease or Infection	Examples	Higher Incidence
Enteric infection	Diarrhea	yes
	Hepatitis A	yes
Respiratory tract infection	Otitis media	yes
	Sinusitis	probably
	Pharyngitis	probably
	Pneumonia	probably
Invasive bacterial diseases	<i>Haemophilus influenzae</i> type b	yes
	<i>Neisseria meningitidis</i>	probably
	<i>Streptococcus pneumoniae</i>	probably
Aseptic meningitis	Enteroviruses	probably
Herpes virus infections	Cytomegalovirus	yes
	Varicella-zoster (chicken pox)	yes
	Herpes simplex	yes
Bloodborne diseases	Hepatitis B	not established
	Human immunodeficiency virus (HIV)	not established
Vaccine-preventable diseases	Measles, mumps, rubella, diphtheria, pertussis, tetanus	not established
	<i>H. influenzae</i> type b	yes
Skin diseases	Impetigo	probably
	Scabies	probably
	Pediculosis	probably
	Ringworm	probably
	CA-MRSA	probably

(Adapted from Pickering and Osterholm, 1997; CDC, 2005)

Patterns of Occurrence of Infectious Disease in Child Care Facilities

Because different infectious diseases have different patterns of occurrence, their detection and prevention are complicated. For example, not every disease associated with out-of-home child care shows the pattern of one apparently affected child or adult and then subsequently other apparently affected children or adults. On the contrary, Osterholm (1994) describes four patterns of infectious disease in child care facilities:

1. Infection affects children, child care staff, and family members. Osterholm refers to these diseases as “equal opportunity infections.” This pattern includes many of the respiratory and GI tract diseases.
2. Infection is not apparent in the children but may be apparent in child care staff and/or parents/guardians. An example of this pattern is the Hepatitis A virus.
3. Infection is apparent in the children but not in older siblings or adults. Examples of this pattern include otitis media, varicella, and *H. influenzae* type b.
4. Infection is mild or not apparent in children, staff, or families but may seriously affect the fetus of previously uninfected pregnant staff person or parent/guardian. The classic example of this pattern of infection is cytomegalovirus (CMV).

Consequences of Higher Incidence of Infectious Disease in Child Care Facilities

The fact that child care facilities are associated with a higher incidence and duration of infectious diseases has created considerable economic stress for families and society and has had a significant impact on the epidemiology of infectious diseases in the United States (Skull et al., 2000). Table 3 on the following page highlights some of the facts and consequences associated with increased illnesses in child care facilities, and a more detailed discussion of the consequences follows.

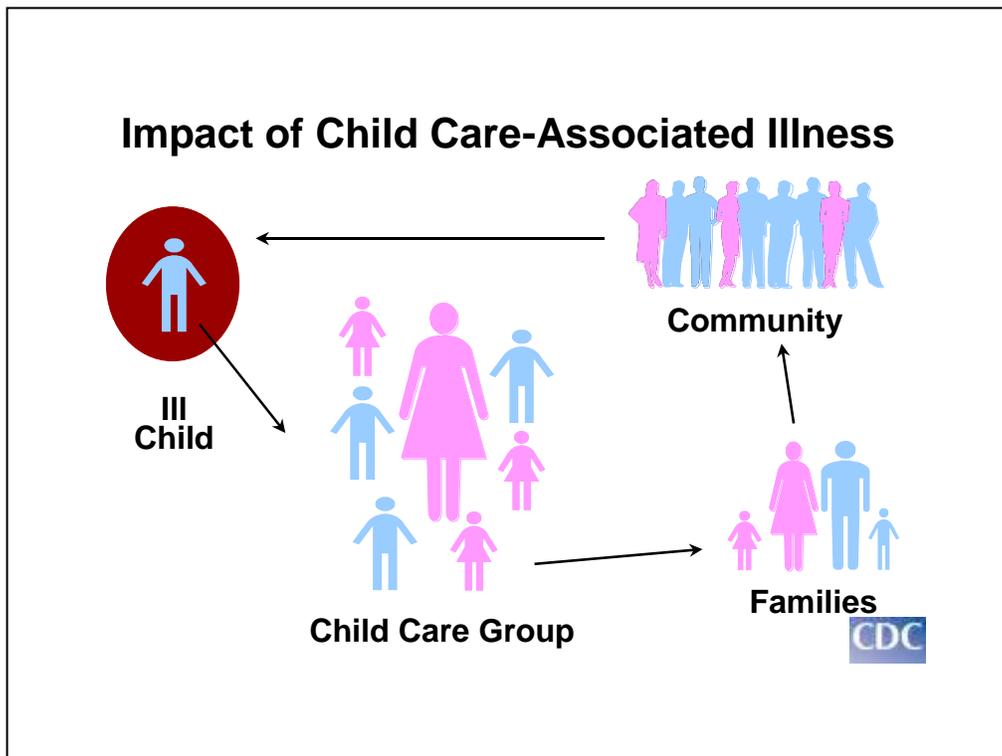
Table 3: Infectious Disease in Child Care Facilities

INCIDENCE	<ul style="list-style-type: none"> • 4-7,000,000 child care-related infections/year among 7,000,000 children under age 5 in out-of-home child care • 2-3 times the risk of infectious diseases (diarrhea, respiratory disease, otitis media) compared with children not in out-of-home care
SEQUELAE	<ul style="list-style-type: none"> • 400,000 medical consultations and/or hospitalizations/year • 25% of household contacts may be secondarily infected • Increased use of antimicrobial drugs
COSTS	<ul style="list-style-type: none"> • 60% of employee absenteeism attributable to unmet child care needs • Parents/guardians miss 1-4 weeks work per year to care for children who become sick or injured in child care
RISK GROUPS	<ul style="list-style-type: none"> • Children in out-of-home child care • Child care workers • Household contacts (e.g., parents/guardians and siblings) of children in child care
TRENDS	<ul style="list-style-type: none"> • An increasing number of mothers with children under 6 work outside the home • Number of children in alternative care settings likely to increase • Incidence of some child-care associated infections (e.g., <i>giardiasis</i>, <i>otitis media</i>) is increasing • Increased risk of antimicrobial-resistant bacterial infection
CHALLENGES	<ul style="list-style-type: none"> • Identify cost-effective control measures • Evaluate efficacy of current prevention recommendations and standards • Train employees in infection control techniques
OPPORTUNITIES	<ul style="list-style-type: none"> • Reduction in infectious disease transmission will benefit families' quality of life • Savings in health care and productivity costs
RESEARCH PRIORITIES	<ul style="list-style-type: none"> • Evaluation of prevention and control strategies • Identifying behavioral and educational interventions to facilitate adherence to good infection control practice
INTERVENTION PRIORITIES	<ul style="list-style-type: none"> • Enhance capacity of public health information systems for communicating with child care staff • Assess models for enhancing delivery of public health services through the child care setting

(Adapted from the National Foundation for Infectious Diseases [NFID], 2006)

Increased Risk of Infection in the Community: Considering the large number of children who attend child care today and the higher incidence of many infectious diseases in these settings, some authorities suggest that child care attendance may serve as an important source of infection of family members and eventually the entire community (Brady, 2005). As illustrated in Figure 1 below, child care caregivers/teachers, siblings, parents/guardians, and other close contacts of children who attend group child care are at increased risk for the infectious diseases associated with child care environments. The NFID (2000) has estimated that 25% of home contacts of children in out-of-home care may be secondarily infected with child care related diseases. Current research supports these propositions.

Figure 1: Impact of Child Care Associated Illnesses in the Community



(Reprinted with permission from Cordell RL, Centers for Disease Control and Prevention. Sanitation issues in child care: practical approaches to solving tough problems in the child care environment. Keynote address to Healthy Child Care North Carolina Invitational Conference; March 12, 2002; Chapel Hill, NC.)

Hurwitz et al. (2000) compared the incidence of influenza in the household contacts of two groups of children (treatment and control groups) in out-of-home child care. The treatment group of children received the flu vaccine, the control group did not. The results indicated that the families of the vaccinated children (treatment group) had 42% fewer respiratory illnesses than the families of the unvaccinated children (control group). Venczel et al. (2001) found attendance or work at a child care facility to be one of the highest risk factors in a community-wide outbreak of Hepatitis A. Similarly, outbreaks of group A streptococcal infection and echovirus 30 infection (Huskins, 2000) in child care centers have been found to infect and cause illness in child care caregivers/teachers and parents/guardians as well as children.

Economic Costs: The increased rates of infection in child care facilities have a significant impact on families and communities due to the cost of additional health care and other illness-related expenses and the loss of income and productivity due to absences from work. Duff et al. (2000) estimated this economic cost at \$1.4 billion per year. As seen in Table 3, the NFID (2006) estimates that parents/guardians lose 1-4 weeks of work days per year to care for ill or injured children.

Several studies have focused on health costs related to child care illnesses in addition to lost work time. Carabin et al. (1999) determined that the average cost per toddler for common illnesses associated with out-of-home care (colds, diarrhea and vomiting) was \$260.70 per six month period. This figure included medication, visits to a physician, and alternative child care, in addition to missed work time costs. Silverstein, Sales, and Koepsell (2003) found that children in center-based care were 2 to 3 times more likely to use health services and this resulted in an estimated difference of \$343 per child compared with children cared for at home.

Quality of Life Costs: What is often overlooked in estimates of the costs of increased illness in out of home care are the intangibles such as the ill child's or parents'/guardians' discomfort and parents'/guardians' sleepless nights and worry as they care for a sick child.

Increased Antibiotic Use and Resistance in Child Care Facilities:

Use of antibiotic therapy has soared in this country over the last several decades. Apart from acetaminophen and aspirin, no other medicines are used so widely (Public Health Laboratory Service, 2002). In recent years, approximately three-fourths of all outpatient antibiotics have been prescribed for upper respiratory infections such as otitis media, which are routinely associated with child care. Moreover, the rate of use by children under 15 years of age is approximately triple that observed for older age groups (Dowell et al., 1998).

A frequent concern of infectious disease authorities is that antibiotics are often misused in managing illnesses, and the misuse appears most prevalent with respiratory and diarrheal illnesses (Brady, 2005). Although the overall rate of antimicrobial prescribing for children has declined since 1990, children with viral respiratory illnesses are still frequently prescribed antibiotics that provide no benefit.^{7.9}

The rationale for increased use of antibiotics in out-of-home child care is unclear. Pressure from child care staff has been implicated as a cause of inappropriate physician referral and increased antibiotic prescribing. Economic factors may provide another explanation. Since parents/guardians of children in out-of-home care often lose income when taking off from work to take care of a sick child, or may need to pay for alternative care for a sick child, they may pressure physicians to prescribe either preventive or therapeutic treatment that, it is hoped, may help a child get well faster.

Whatever the cause, unnecessary antibiotic use is considered a major risk factor for acquisition and spread of antibiotic-resistant strains of common infectious diseases in children (Brady, 2005). In unveiling its annual *Report on Infectious Diseases* in June 2000, the World Health Organization warned that the misuse of antibiotics eventually would compromise all nations' ability to treat even minor infectious diseases, like sore throats (Twersky, 2000).

To reduce the risk of antibiotic resistance, *CFOC* (3rd ed., 2011) states that “While antibiotic therapy for a diagnosis of pharyngitis due to group A streptococci is indicated, for some conditions such as otitis media, antibiotic therapy is only occasionally recommended. For other conditions such as the common cold and nonspecific cough illness/bronchitis, antibiotic therapy is not indicated.” (p. 330).

It is not surprising that antibiotic-resistant strains of diseases have emerged among children in child care settings, as compared with children cared for at home, given the following connections between infectious disease and child care facilities:

- increased prevalence of infectious disease in child care
- increased opportunity for transmission of infections due to children's physiologic and hygienic immaturity
- more frequent use of antibiotics—especially in larger child care facilities

Control of the spread of antibiotic resistance has been identified as a priority by many organizations, including the Centers for Disease Control and Prevention, the American Society for Microbiology, the World Health Organization, the American Academy of Family Physicians, and the American Academy of Pediatrics (English & Gaur, 2010).

Action Items for the CCHC

The CCHC should prepare health education materials for child care caregivers/teachers and parents/guardians on the following topics:

- **Infections that pose the greatest risks for children and child care staff and their patterns of manifestation:** The child care staff and vulnerable mothers need to be especially aware of the CMV virus and take necessary precautions [7.7.1.1](#) (Also see the section on Prevention of Infectious Diseases in the Child Care Setting in this Module.)
- **The relationship between unnecessary antibiotic use and antibiotic resistance:** The *CFOC* standards (3rd ed., 2011) note that unnecessary antibiotic use “...is common in child care enrollees with mild respiratory tract infections, the majority of which are

caused by viruses. Parents/guardians may pressure their primary care provider to prescribe antibiotics because they believe that antibiotics will shorten the duration of exclusion from child care. Primary care providers and caregivers/teachers should reinforce an understanding of the ineffectiveness of antibiotics on duration of viral upper respiratory tract infection and should attempt to retain enrollees unless they meet exclusion criteria”(p.311). “Children treated with antibiotics are at increased risk of becoming carriers of resistant bacteria” (p.329).

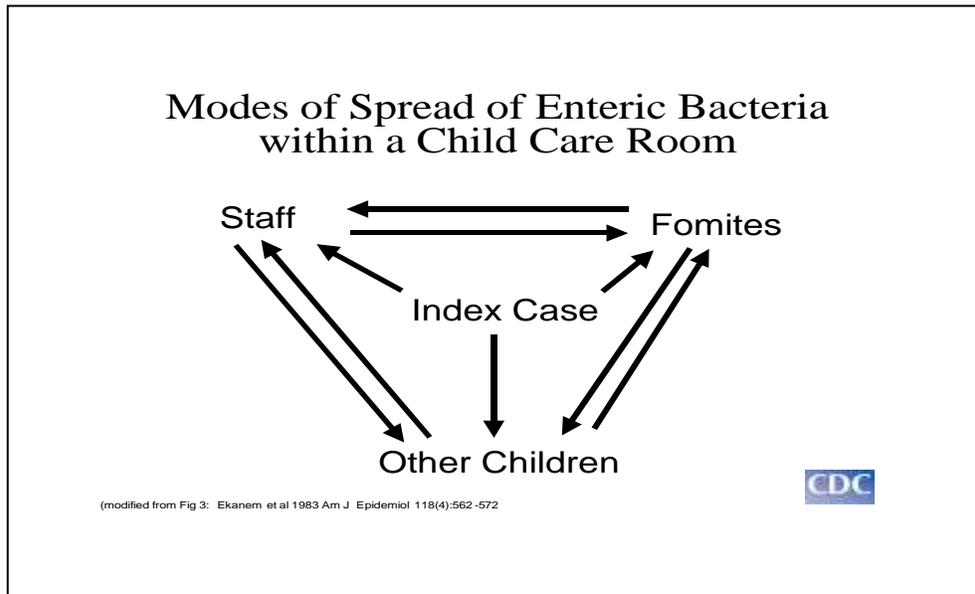
- **Proper use of prescribed antibiotics: Antibiotic resistance can also result from** under- or improper use of antibiotics. When antibiotics are prescribed for children in child care, the CCHC should stress the need to complete the course of therapy.

WHAT THE CCHC SHOULD KNOW: TRANSMISSION OF INFECTIOUS DISEASE IN CHILD CARE SETTINGS

This section examines how the transmission of childhood diseases may occur and the factors in the child care environment which may facilitate transmission of infectious disease.

Using the example of enteric bacteria, the transmission of disease in child care is not unidirectional nor is it necessarily through direct contact. Rather, pathogens are transmitted back and forth among staff and children directly through mutual contact and indirectly through intermediate inanimate agents, such as clothing, bedding, toys, carpeting, and other surfaces that are capable of absorbing and transmitting pathogens (fomites). This is illustrated in Figure 2 below.

Figure 2: Transmission Dynamics of Pathogens in Child Care Using the Example of Enteric Bacteria



(Reprinted with permission from Cordell RL, Centers for Disease Control and Prevention. Sanitation issues in child care: practical approaches to solving tough problems in the child care environment. Keynote address to Healthy Child Care North Carolina Invitational Conference; March 12, 2002; Chapel Hill, NC. Figure adapted from Ekanem, Dupont, Pickering, Selwyn, and Hawkins (1983).)

Modes of Transmission of Childhood Infectious Diseases

Respiratory

The most common mode of respiratory disease transmission is through direct contact with the mucous membranes of the nose, mouth, or eyes (Churchill and Pickering, 1997). Young children are especially susceptible to this type of transmission because of their inadequate

hygiene (e.g., infrequent and/or inadequate handwashing) and behaviors (e.g., mouthing objects, sucking thumbs or hands, and rubbing their eyes and noses).

The respiratory diseases that are more common among children in child care than among children cared for in their own homes include recurrent otitis media (ROM), meningitis, upper respiratory infections, and pharyngitis.

The following is a list of the most common respiratory pathogens known to be transmitted at higher rates among children in child care settings:

Bacteria	Viruses
<i>Hib</i>	Adenovirus
<i>N. meningitidis</i>	Coronavirus
<i>S. pneumoniae</i>	Enteroviruses
<i>S. pyogenes</i>	Influenza/parainfluenza
<i>Bordetella pertussis</i>	Measles/Mumps/Rubella
<i>M. tuberculosis</i>	Parvovirus B19
	Respiratory syncycial virus (RSV)
	Varicella

(Adapted from Churchill and Pickering, 1997)

Fecal-oral

The presence of diaper-aged children and the mouthing behaviors of infants and toddlers are the most important risk factors for fecal-oral disease transmission in child care environments (Huskins, 2000). Other risk factors include inadequate hygiene practices such as inadequate handwashing by child care staff and environmental fecal contamination, e.g., the sandbox.

The two main diseases that are transmitted through the fecal-oral route are infectious gastroenteritis (nausea, vomiting, and diarrhea) and Hepatitis A. Other organisms that can be transmitted by the fecal-oral route include:

- Parasites: *Giardia* and *Cryptosporidium*
- Viruses: polio, rotavirus, norovirus, astrovirus, calicivirus, and enteric adenovirus
- Bacteria: *Shigella*, *Salmonella*, *Campylobacter*, *E. coli*, *Yersinia*, and *Clostridium difficile*.

The bacteria are usually the most severe culprits of illness, with *Shigella* and *Salmonella* commonly reported in child care bacterial outbreaks. Viruses, including rotavirus and norovirus, cause most of the infectious diarrhea in child care. Norovirus may become the single most common cause of viral gastroenteritis in child care now that a rotavirus vaccine has been developed. The norovirus is also noteworthy because it is resistant to commonly used disinfectants.

Skin to Skin

A number of viruses, bacteria and parasites can be transmitted through direct skin contact or through skin contact with contaminated clothing or objects (Huskins, 2000). Touching and

sharing of personal belongings such as coats, hats, combs, brushes, stuffed toys, etc. contributes to the spread of these infections.

The following are common skin-to-skin infections:

- Parasites: lice, scabies, scalp ringworm, and body ringworm
- Viruses: Herpes simplex (cold sores), Varicella-zoster, *Molluscum contagiosum*, and HPV (warts)
- Bacteria: Group A strep and *Staphylococcus aureus*

Methicillin-resistant *Staphylococcus aureus* (MRSA), another infectious skin disease, is increasingly common in child care settings. The increase in incidence is related to the rise of asymptomatic child and adult staph carriers and shared items, which spread the staph from carrier to new host. Factors associated with the spread of MRSA infections include open wounds, skin-to-skin contact, contaminated surfaces and items, crowded conditions and poor hygiene. The pathology of the disease and the child care environment create a synergistic effect (Kaplan et al., 2005). Appearing as a rash, open wound or pimple, MRSA infections are usually mild and often heal on their own when kept clean and dry (Healthy Child, 2005). MRSA infections rarely become a systemic problem.

Blood, Urine, Saliva

Several diseases can be transmitted through contact with blood, urine or saliva. Unhygienic age-specific behaviors, such as mouthing and the presence of diapered children, increase the risk.

Some organisms commonly communicated by blood and bodily fluids include Cytomegalovirus (CMV), Epstein-Barr virus, Herpes simplex virus, Hepatitis B, and HIV. Hepatitis B is transmitted by blood and certain body fluids such as vaginal secretions but not by saliva, sweat, tears, stool, or vomitus.

Arthropod Borne

Several diseases are transmitted through insect bites, such as from ticks (Lyme disease, Rocky Mountain spotted fever, and Ehrlichiosis) and mosquitoes (West Nile Virus and other arboviruses such as Eastern Equine encephalitis). Outside activity without proper protection from insect repellent (used sparingly) or clothing can increase the risk for being bitten by a disease-bearing insect.

Factors Which May Facilitate the Transmission of Infectious Disease in Child Care Facilities

Child Factors

The following list of characteristics illustrates the fact that the participants in child care programs are at increased risk for the development and transmission of infectious disease just because they are young.

Immature Immune Systems: Maternal antibodies provide disease protection for very young infants, but once these recede from their systems they are especially vulnerable to a variety of infections until they develop their own antibodies.

Physiological Immaturity: Physiologically, infants and young children require hands-on care to maintain their existence. In the child care setting this need is likely to bring them into close physical contact with a variety of caregivers/teachers for routine activities such as feeding, diapering, and cuddling. While essential, such contact also increases the risk for infection. Infants and young toddlers are also incontinent which poses a unique risk for transmission of urinary and fecal pathogens. Furthermore, they are less able to control the drooling/leaking of fluids from their mouths which increases the risk of transmission of respiratory secretions. Finally, some anatomical features, such as the Eustachian tube in the ear, are not fully developed in young children, which may contribute to the risk of infections such as otitis media.

Developmentally Appropriate Behaviors: Infants and young children typically explore the environment manually and orally as well as visually. Quite literally, they try to manipulate everything and if possible put it in their mouths along with their fingers and thumbs. Young children are also incapable of basic hygienic behaviors such as wiping their noses, washing their hands, or keeping their mouths closed to prevent drooling. All of these behavioral characteristics increase the potential for children to transmit respiratory secretions and fecal pathogens.

Environmental Factors

Various aspects of the child care setting can also have an impact on the transmission of infectious disease.

Size of the Facility/Number of Children in Attendance: The explanation most commonly offered for the higher rates of communicable illnesses among children in out-of-home child care is the increased exposure these children receive to pathogens carried by both other children and the staff, as compared to the exposure received by children cared for in their own homes.

Cordell (2002) likens the child care setting to a “pot luck dinner” where each child brings his/her own contribution of pathogens and shares them with all of the other participants and samples their contributions in return. In this sense, the likelihood that a child will come into contact with a potential infectious agent depends upon how often that agent is introduced into the child care environment. For example, if a child is routinely in contact with only four other children daily, it is less likely that one of the other children in his/her group will bring an infectious agent into the setting than if there were 40 other children in the group. The NICHD Network (2001) study found that up to a threshold of perhaps 8-10 children, the greater the number of other children and the greater the amount of exposure, the greater the likelihood of contracting an illness. Size of facility is the most frequent explanation for the general finding that children in child care centers, which are typically larger facilities, experience more bouts of illness than children in the generally smaller family child care homes.

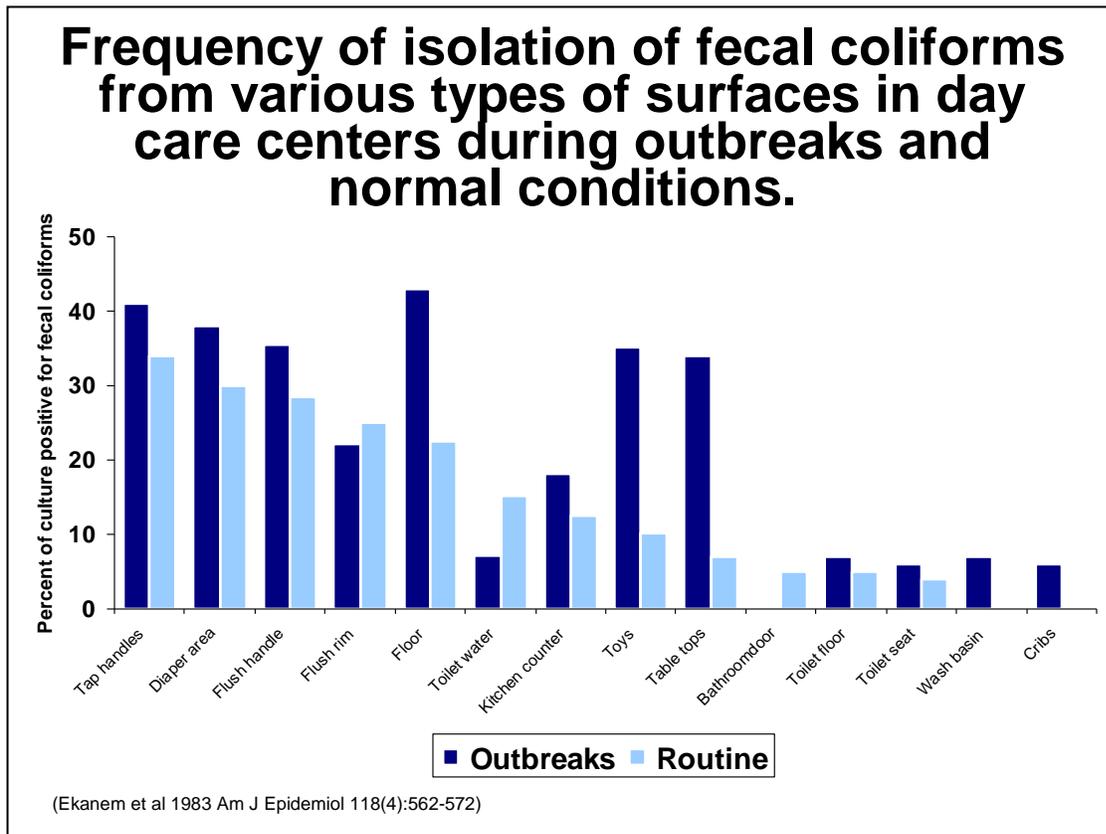
Cordell et al. (1997, 1999) believe, however, that the effect of the size of the facility/number of children in attendance has been exaggerated in the infectious disease literature due to the type of reporting procedures used. They note that studies producing this result are based on illnesses measured by parental report or medical records. They contend that these figures reflect absences due to illness rather than actual incidences of illness. In two studies based on provider report rather than parental report, Cordell et al. (1997, 1999) found that child care homes had a higher incidence of illness, but lower incidence of absence due to illness than child care centers. They explain their results as follows: the more frequent absences due to illness in child care centers reflect the stronger illness exclusion policies in these facilities. Child care homes are less likely to exclude children due to illness, thus they have a higher incidence of illness. Cordell et al. propose that the parents of children in child care centers who must seek alternative care when their children are ill are more likely to remember and report episodes of illness and to seek medical treatment than are parents who can continue to use (family) child care in spite of mild illnesses.

Age Group Mixing: The frequency and degree of age-group mixing in child care settings is believed to increase the risk of exposure to infectious agents.^{2.1.2.4} Studies have shown that in facilities where pre-toilet trained and toilet-trained children are grouped together, the potential transmission of enteric agents is increased for the toilet-trained group. Conversely, the potential for transmission of certain respiratory-tract agents such as *H. influenzae* type b is greater for young infants when they have routine contact with older toddlers and preschoolers in whom this bacterium may be colonized. In contrast, children who are reared at home typically have fewer contacts with children, and especially fewer contacts with children who are younger or older (Huskins, 2000).

Unhygienic Conditions and Practices: The room arrangement and equipment, such as a separate diaper changing area with a nonporous surface, a sink within arm's reach, and a proper storage container for soiled diapers;^{5.2.7.4, 5.4.2.4, 5.4.2.6} the number and location of sinks and toilets;^{5.4.1.2, 5.4.1.6, 5.4.1.10} ventilation;^{5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4, 5.2.1.7, 5.2.1.8} the cleanliness and maintenance of the facility, including floors and surfaces,^{3.3.0.1, 5.4.1.7, Appendix K} toys,^{3.3.0.2} and bedding;^{3.3.0.4} and the condition of food preparation areas (see the *Nutrition and Physical Activity in Child Care* Module for more information about food safety) also influence the risks for infectious disease in child care settings (*CFOC*, 3rd ed. 2011;).

Figure 3 on the following page illustrates the role of environmental hygienic factors in transmission of disease in child care. The graph compares the frequency of fecal pathogens on various surfaces in the child care environment under normal conditions and during a diarrhea outbreak. As shown, during an outbreak, fecal pathogens increased on most surfaces, and dramatically on three surfaces; floor, toys, and table tops. The data suggests that hygienic attention to these surfaces would reduce the presence of enteric pathogens and thereby reduce the risk of transmission.

Figure 3:



(Reprinted with permission from Cordell RL. Centers for Disease Control and Prevention. Sanitation issues in child care: practical approaches to solving tough problems in the child care environment. Keynote address to Healthy Child Care North Carolina Invitational Conference; March 12, 2002; Chapel Hill, NC. Graph adapted from Ekanem, Dupont, Pickering, Selwyn, and Hawkins (1983).)

The playground is often overlooked as part of the child care learning environment. Toys and equipment used outdoors can transmit disease as effectively as those used indoors. An uncovered sandbox, for example, can be contaminated by cats and other animals and is a source for disease transmission [6.2.4.1](#). Also the playground area is usually not as well equipped with supplies to manage body fluids (tissues, diapers, first aid kits) as are indoor areas, which further increases its propensity to transmit disease.

Inadequate hygienic practices, and in particular, poor handwashing, diapering, and cleaning routines, have received close scrutiny in the infectious disease literature as means of disease transmission. For example, Roberts et al. (2000) provided training in personal hygiene and handwashing techniques to the staff of a child care center and asked them to teach the handwashing methods they had learned to the children in their care. They then compared the rate of diarrheal incidence in this center with that of a control center that had maintained its usual handwashing procedures. The results indicated that episodes of diarrhea in the intervention center declined by 50% compared to the control centers for children over 2 years

of age. For those centers where the children's compliance with handwashing procedures was high, diarrheal episodes declined by 66%. Using a similar educational and staff training approach, Kotch et al. (2007) found a difference in rates of severe diarrhea between intervention and control centers for children under 24 months.

Staff Factors

Kotch (2001) suggests that certain characteristics of the child care staff may contribute indirectly to the incidence of disease in out-of-home child care. First, child care is often staffed with caregivers/teachers who lack experience, education, and training in appropriate hygienic practices necessary for the prevention of infectious disease. Second, the staff: child ratio itself can affect the spread of infection in the sense that a caregiver/teacher responsible for a large group of children would have greater difficulty adhering to hygienic practices than a caregiver/teacher caring for a small group. Also, a caregiver/teacher responsible for a large group would have more children with whom to share pathogenic organisms. In fact, Pittet (2001) reports that a high workload and understaffing are two of the factors associated with handwashing noncompliance in hospital settings.

Action Items for the CCHC

- Use his/her expertise and health training to communicate the factual information about infectious disease transmission in a way that does not intimidate or alienate the caregiver/teacher but instead instills confidence and understanding.

- Assist the staff in understanding transmission factors that she/he cannot modify (e.g., child factors) and in identifying factors that she/he can modify (e.g., handwashing and sanitation procedures) to reduce disease transmission.

WHAT THE CCHC SHOULD KNOW: PREVENTION OF INFECTIOUS DISEASE IN CHILD CARE FACILITIES

Prevention through Immunization

Preschool-aged children currently have the highest age-specific incidence of many vaccine-preventable diseases, including, measles, pertussis, rubella, influenza, varicella, rotavirus, diseases due to *Haemophilus influenzae* type b and pneumococcus^{7.2.0.1}. As a result, immunization is of highest priority for children in child care. Most states mandate age-appropriate immunization of children attending child care facilities. Every January, the CDC posts the recommended childhood immunization schedule [Appendix G](#) for the United States on their website after it is first reviewed and approved by the American Academy of Pediatrics and the American Academy of Family Physicians. The 2011 schedule for children ages 0 to 6 is available at:

<http://www.cdc.gov/vaccines/recs/schedules/downloads/child/0-6yrs-schedule-pr.pdf>.

Changes to the schedule over recent years that impact young children include the recommendation for the Rotavirus vaccine, an updated vaccination schedule for the varicella vaccine, recommendations for the Hepatitis B vaccine for children who did not receive the birth dose, the recommendation that all children age 6-59 months receive 1-2 doses of influenza vaccine yearly, depending on the child's history of H1N1 vaccination. The Hepatitis A vaccine is now recommended for all children at 12 months of age, and a new conjugated meningococcal vaccine is recommended for certain children at high risk beginning at age 2 and for all children around age 11. The 2009 edition of *The Red Book*, published by the AAP, has a table that describes the status of licensure and recommendations for new vaccines. CCHCs should be familiar with the newest guidelines for vaccinations and should be able to translate the rapidly changing immunization schedule to child care caregivers/teachers and parents/guardians.

The adult immunization schedule is available at

<http://www.cdc.gov/vaccines/schedules/downloads/adult/adult-schedule.pdf>

Since state requirements for immunization may differ, *CFOC* (3rd ed. 2011) states that child care facilities should require that all parents/ guardians of children enrolled provide written documentation of receipt of immunizations per the national recommendations.^{7.2.0.1} The schedule for 2011 is presented on the following page.

Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States • 2011

For those who fall behind or start late, see the catch-up schedule

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years
Hepatitis B ¹	HepB		HepB			HepB						
Rotavirus ²				RV	RV	RV ²						
Diphtheria, Tetanus, Pertussis ³				DTaP	DTaP	DTaP	see footnote ³	DTaP				DTaP
<i>Haemophilus influenzae</i> type b ⁴				Hib	Hib	Hib ⁴	Hib					
Pneumococcal ⁵				PCV	PCV	PCV	PCV				PPSV	
Inactivated Poliovirus ⁶				IPV	IPV	IPV						IPV
Influenza ⁷						Influenza (Yearly)						
Measles, Mumps, Rubella ⁸							MMR		see footnote ⁸			MMR
Varicella ⁹							Varicella		see footnote ⁹			Varicella
Hepatitis A ¹⁰							HepA (2 doses)				HepA Series	
Meningococcal ¹¹											MCV4	



Range of recommended ages for all children



Range of recommended ages for certain high-risk groups

Written documentation of a child's immunizations must be retained at the child care facility and updated on at least a quarterly basis. [7.2.0.1](#) If a child is under-immunized because of medical, religious, or personal reasons, proper documentation of the reasons or a waiver must be provided and kept on file, as required by law. Also, the caregiver/teacher must notify the parents/guardians of the risk of the spread of communicable disease, and the potential risk of exclusion of the child from care if a disease to which she/he is susceptible occurs. [7.2.0.2](#) The staff must also be current for adult immunizations. [7.2.0.3](#), [Appendix E](#)

Prevention Through Disease Management Practices

Although vaccination has reduced the risk of more serious diseases in child care, children attending child care facilities remain at higher risk for common communicable illnesses (NICHD, 2001). To reduce the incidence of these illnesses, the infectious disease research recommends that the best recourse for facilities is to:

- Improve the level of hygienic conditions, especially handwashing and sanitation of mouthed and unmouthed objects
- Avoid combining infants/young toddlers with older children as much as possible
- Reduce group sizes as much as possible
- Maintain a low staff: child ratio
- Follow consistent reporting procedures

The research interventions used in child care disease prevention studies have relied primarily on training and education in good hygiene for staff, or staff and children. Some studies have focused on training in specific procedures, such as handwashing, while most have trained child care staff in a variety of procedures, such as diapering, food preparation, and cleaning and sanitation of the environment and toys. The specific training techniques have also varied. Studies have used lectures, slide shows, hand-outs, posters, written policies, and active demonstrations with practice and evaluation. Some studies have involved a single, one-time training while most followed the initial training with refresher trainings or periodic updates. Also, studies vary in whether training was held in the child care setting or off-site. However, regardless of the type of methodology used, most studies reported reduced rates of infection as a result of their intervention. Also, the studies using the most intensive interventions (Krillov et al., 1996; Uhari and Mottonen, 1999) obtained the most impressive results.

Cordell (2002) points out that staff often misunderstand the distinction between cleaning and sanitizing, assuming that if a surface "looks clean," it "is clean" and unlikely to transmit disease. A brief review of cleaning and sanitation procedures is presented on the following page.

REVIEW: Cleaning versus Sanitizing versus Disinfecting [3.3.0.1](#)

To clean something is to physically remove all dirt and contamination.

Use a single-use, disposable paper towel or cloth and soap and hot water to clean surfaces. This removes the visible dirt.

To sanitize something is to reduce the germs to levels considered safe by public health codes or regulations.

Spray the area with a sanitizer registered with the Environmental Protection Agency (EPA) or bleach and water dilution. For the EPA-registered sanitizer, follow the directions on the manufacturer's label. For the bleach and water solution, allow the surface to air dry or wait two minutes and wipe it dry with a disposable paper towel. [Appendix J](#)

To disinfect something is to destroy or inactivate most germs.

Spray the area with an EPA-registered disinfectant or bleach and water dilution. For an EPA-registered disinfectant, follow the directions on the manufacturer's label. For the bleach and water dilution, allow the surface to air dry or wait two minutes and wipe it dry with a disposable paper towel. [Appendix J](#)

REVIEW: Preparing the Sanitizing Bleach and Water Dilution for Items Intended for the Mouth [3.3.0.2](#), [3.3.0.3](#), [Appendix J](#)

The following steps should be followed to prepare the bleach and water sanitizing dilution for mouthed items:

1. Select an opaque spray bottle.
2. Make sure that the room is well ventilated.
3. Wear gloves and eye protection, and use a funnel.
4. Mix 1 tablespoon bleach (no more) and one gallon of cool water.
5. Prepare the solution daily; label the bottle with contents and where it is to be used, [5.2.9.1](#) and the date mixed.
6. Store the solution separate from foods and in a cabinet inaccessible to children. [5.2.9.1](#)
7. Toys that children have placed in their mouths or that are otherwise contaminated by body secretion or excretion can also be sanitized in a mechanical dishwasher that meets certain requirements. [4.9.0.11-4.9.0.13](#)

For the CCHC, a critical research result is the importance of monitoring child care hygienic procedures to insure their effectiveness. Rosen et al. (2009) completed a cluster-randomized trial, with randomization at the level of the preschool, in 40 Jerusalem preschool classrooms. Eighty preschool educators participated. The program used a multipronged approach which included elements aimed at staff, children, parents, school nurses and the classroom environment. Lectures by medical, epidemiological and educational experts, along with printed materials and experiential learning, were provided to staff. The combination of positive attitudes toward handwashing among educators and the program's effectiveness in imparting knowledge helped to create a sustained social norm of handwashing among many children in disparate locations. Evidence suggests that even handwashing, which is generally acknowledged as the single most important personal hygiene procedure to prevent transmission of infectious agents, requires constant monitoring to insure compliance (AAP, 2000; Pittet, 2001). Consider the following

message sent by the Executive Director of the North Carolina Child Care Resource and Referral Network to local child care resource and referral agency directors on March 23, 2002 as a model for reminding child care caregivers/teachers about hygiene procedures:

*Dear CCR&R Directors,
Since "Personal Care Routines", especially handwashing, represented some of the lowest scores on the program assessments done on even 4 and 5 star centers, all of our staff need to be reminded on an ongoing basis about the information you can find at the link provided below.¹ Please give a look, print out information and continue to share it with your staff at every opportunity.
Thanks as always,
Mary Bushnell*

Correct hand hygiene and diapering and food service techniques are available from many sources, including the *CFOC* (3rd ed., 2011). See the standards listed at the beginning of this Module for specific references. Soap and warm water should be used to wash hands after diapering and any time they appear visibly soiled. Hands may also be disinfected at other times by use of an alcohol-based foam or gel.

Finally, epidemiologists stress that rapid reporting of disease outbreaks^{3.6.1.4} to the proper health authorities is critical to the prevention of infectious disease. Yet, in a study comparing different reporting procedures, MacDonald et al. (1997) found that child care staff are often unaware of reporting requirements, and if reporting occurred at all, it was often delayed or incomplete. To some extent, staff may feel reticent to report illnesses for fear it would damage the reputation of their facility in the community or provoke a reaction from parents/guardians of participating children (Isbell, 2002).

CFOC (3rd ed., 2011) recommends that local and/or state health authorities should be notified (sometimes immediately) about occurrences of the following infections:

- *H. influenzae* type b (HIB) ^{7.3.2.3}
- *S. Pneumoniae* ^{7.3.9.2}
- *N. meningitis* ^{7.3.5.2}
- Pertussis ^{7.3.7.1}
- Group A Streptococcus (GAS) ^{7.3.1.2}
- Tuberculosis ^{7.3.10.1}
- Herpes simplex ^{7.7.2.1}
- Enteric viruses (in some cases) and Hepatitis A (HAV) ^{7.4.0.1, 7.4.0.3}
- Hepatitis B (HBV) ^{7.6.1.1}

The CCHC (or child care director) should also notify local and/or state health authorities about occurrences of:

- *E. coli* 0157
- Shigella

¹ The link referred to connects to American Academy of Pediatrics policy statement on infection control in physicians' offices (American Academy of Pediatrics, 2000). Reprinted with permission from Mary Bushnell, Executive Director of the North Carolina Child Care Resource and Referral Network, April 29, 2002.

- Giardia
- MRSA infection outbreak (not a single incidence)

The CCHC must be familiar with state regulations regarding the reporting of communicable disease. Most states specify the diseases that must be reported and to whom, the time frame for reporting, and the method of reporting. Caregivers/teachers should also notify the parents/guardians of other children in the facility of any incidences of infections [3.6.4.1](#), [3.6.4.2](#), and if possible, accompany the notification with information about the disease, and the steps the facility is taking to prevent it from spreading to other children. Parent/guardian letters should be developed in conjunction with state or local health departments and the state child care regulatory agency to ensure accuracy and consistency of information and policy.

State and Local Regulations for Disease Management

In addition to the *CFOC* standards (3rd ed., 2011), the CCHC must be familiar with state and local regulations, licensing requirements, and laws that apply to infectious disease transmission in the areas she/he serves. Some requirements are regulated through state child care licensing authorities, while others may be regulated locally through the sanitation section of community health departments. A sampling of such regulations are:

- Staff: child ratio requirements for your state
- Square footage requirements for space indoors and outdoors
- Sanitation requirements
- Immunization requirements
- Disease management policies
- Reporting procedures

Policy Development and Implementation

Program policies must be in place for child care facilities to effectively reduce transmission of infections. Disease prevention is reflected in policies addressing the physical environment (e.g., the number of children, staff: child ratio, use of space, and location of sinks, supplies, and ventilation), protocol for hygiene (e.g., handwashing, diaper changing, sanitizing toys and surfaces, preparation of disinfectant solutions, handling of body fluids, use of gloves, food preparation and serving, and universal precautions), protocol for exclusion and/or isolation of sick children, managing staff illness, immunization of children and staff, and reporting procedures. Policies should be readily accessible to staff and parents/guardians, and reviewed regularly.

General Principles for Exclusion Criteria

For children with any illness, exclusion should be considered if any of the following are true [3.6.1.1](#):

- The illness prevents the child from participating in activities
- The illness demands more care from staff than they can provide
- The child who is ill may transmit the disease to others in the child care setting

In the case of respiratory illness: A child may be excluded if she/he manifests a fever along with behavior or secondary signs and symptoms such as:

- Lethargy
- Uncontrolled coughing
- Inexplicable irritability or persistent crying
- Difficulty breathing
- Wheezing
- Other signs or behaviors which are unusual for the child.

Children who are excluded from care for these reasons can return once symptoms have abated and/or they have a health care provider certify that they are safe to return to care. There are a number of diseases, including influenza, measles, rubella, and varicella, that are infectious for 1-2 days before symptoms begin. Thus, exclusion of ill children may not prevent an outbreak and hygiene should be a top priority at all times.

For gastroenteritis: The following exclusion criteria are suggested:

- Inexplicable bloody stools
- Abdominal pain for more than two hours
- Intermittent abdominal pain accompanied by fever or other signs or symptoms
- Vomiting
- Diarrhea

Children with Hepatitis A should also be kept out of child care until a health care provider confirms it is safe for them to return.

For diseases that are spread through skin-to-skin contact or through other body fluids:

Children exhibiting the following signs or symptoms may be excluded:

- Mouth sores with drooling (unless determined to be noninfectious)
- Rash with fever or behavior change (until determined by a health care provider not to have a communicable disease)
- Impetigo (until 24 hours after treatment has started)
- Draining boils or skin lesions that cannot be covered by a dressing (i.e., lesions on the hands or face)
- Purulent conjunctivitis (until treatment has started)
- Scabies (until after treatment has been completed)
- Shingles, which usually affects caregivers/teachers rather than children, if the lesions are on the hands or face and cannot be covered by clothing and bandages (until a health care provider confirms return is safe)

Children with head lice do not have to be excluded in the middle of the day, but the lice should be treated overnight before the children may be admitted the following day.

Sensitivity to Infectious Disease Dilemmas for Child Care Staff

A hygienic setting is likely the goal of child care caregiver/teacher and CCHC alike. However, achieving this goal on a daily basis can be especially challenging for caregivers/teachers in view of other demands that they provide an attractive, comfortable and stimulating setting, with lots of opportunity for social interaction, learning, and physical

activity. In assisting the provider to develop disease prevention policies, the CCHC should be sensitive to some of the dilemmas the provider may face.

Hygiene versus Comfort: It can be difficult to incorporate hygienic features into the child care environment when also trying to create a comfortable space. For example, chairs that are soft and comfortable may also absorb body fluids and head lice or scabies. The caregiver/teacher may need to compromise to enable comfort and hygiene to co-exist in the child care environment.

Hygiene versus Convenience: Strict hygienic practices must be adhered to in order to reduce the risk of spreading infection. However, these practices also take up valuable time for the caregiver/teacher. For example, handwashing is the most important practice to incorporate into daily routines, but it must be carried out at a specific location and at specific times that may be inconvenient and seem to interfere with the care provided.

Hygiene versus Parent/Guardian Wishes: If parents/guardians disagree with policies and practices, they may withdraw their children from the program. For example, it is recommended that clothing soiled with blood be bagged and sent home to be washed. A parent/guardian may resent this and feel that the caregiver/teacher should assume the responsibility to clean the clothing immediately so that it doesn't develop stains.

Hygiene versus Culture: Cultural influences can conflict with recommendations for prevention of spread of infection. As examples, some cultures may forbid the use of immunization for disease prevention or may customarily eat with their hands instead of using utensils.

Action Items for the CCHC

- Assist the staff in writing policies that will minimize the spread of disease and in developing methods to insure the policies are appropriately and consistently carried out. For example, the CCHC should make certain that immunization schedules are followed and immunization files are kept up to date.
- Be able to recognize infectious diseases and their symptoms in the child care setting and inform child care staff and parents/guardians about prevention of these diseases.
- Make sure children are taught information and behaviors that will support a healthy child care environment. Books, games, or songs may be used to teach children about diseases and healthy hygiene habits.
- Be familiar with available agencies and resources in the community, state, and nation to assist child care programs in dealing with infectious disease.

WHAT THE CCHC SHOULD KNOW: DISEASE PREVENTION BENEFITS OF OUT-OF-HOME CHILD CARE

In light of the information on higher incidence of communicable disease in out-of-home child care presented in earlier sections of this Module, discussion of the healthful benefits of child care may appear a contradiction of terms. However, there is strong indication that child care is a major player in the prevention of childhood diseases. Even before discussing benefits, though, it is important to address whether increased illnesses in child care settings delay children's cognitive and social development.

Effects of Illness in Child Care on School Readiness and Social Behavior

In addition to tracking the rates of common illnesses in out-of-home child care, the NICHD Research Network study (2001) examined whether the higher frequency of illness in these settings during the first two years was associated with poorer developmental outcomes at age 3. At age 3, the children in this study were assessed for school readiness, verbal comprehension and expressive language, and social behavior. The results indicated that the increased illness in out-of-home care did not negatively affect language development or school readiness.

Benefits of Out-of-Home Child Care

Immunization Benefits

As mentioned earlier, preschool-aged children comprise the segment of the population most likely to be under-immunized for vaccine-preventable diseases. [7.2.0.1](#) Child care may provide a solution to this problem. For children reared at home, immunization is not regulated and as a result children may fall behind the recommended schedule until they enroll in elementary school. However, most states have extended their elementary school requirements and now require age-appropriate immunizations for attendance in regulated child care programs. As the number of regulated programs increase through incentives such as those of the North Carolina Smart Start Program and as more and more children enroll in child care, the percentage of appropriately immunized preschoolers should increase.

Increased Hygienic Awareness and Compliance

Pickering (1990) remarked that contact with health experts may heighten awareness of disease control among child care staff and encourage compliance with hygienic recommendations. A study by Alkon, Sokal-Gutierrez, and Wolff (2002) bears this out. These researchers evaluated the effect of child care health consultation services on child care staff knowledge about health-related issues and compliance with the *CFOC* (3rd Ed., 2011) standards. They found that centers receiving child care health consultation services (treatment group) showed increased health knowledge and compliance with the standards as compared to centers not receiving these services (control group). However, although the observers in this study reached 90% agreement in coding compliance to the standards, they were aware of the experimental status of the different centers (treatment or control) which may have biased their observations (Alkon, 2002). In fact, most studies of disease prevention in child care have relied on increased staff awareness and motivation to achieve results. Through daily curriculum and parent/guardian outreach programs, regulated child care also

provides greater opportunity for hygienic education and training for children and their parents/guardians.

Protection from Later Infections

The prevalence of childhood respiratory illnesses has increased dramatically in the last several decades. Allergies, particularly asthma, have reached epidemic proportions in the United States and developed countries. One hypothesis suggests that reduced exposure to other children and infections early in life is partly responsible for this trend (Cookson and Moffat, 1997). Since by definition, it increases exposure to other children and is historically associated with an increased risk of infection in early years, child care has served as a “laboratory” for testing this hypothesis.

As early as 1986, researchers noticed that children in child care facilities had a higher incidence of respiratory infections during the first two years of life as children reared at home. But after age three the relationship appeared to invert, and the incidence among children in child care was lower than that for home-reared children (Denny, Collier and Henderson, 1986). It is reasonable to believe that this relationship would continue through the early elementary school years (Henderson FW, personal communication).

The possible protective influence of child care has generated intense interest among studies of childhood allergies and asthma. A large longitudinal study in Arizona found that among children with a family history of allergies and asthma, those who attended child care, especially during infancy, were more likely to have frequent bouts of wheezing at age two than children reared at home with no siblings but less likely to have wheezing attacks from age 6 through 13. These children also had a significantly lower prevalence of high serum IgE concentrations, skin-test reactivity to any allergen, and skin-test reactivity to the allergen most commonly associated with asthma in their geographic area [Tucson] (Ball et al., 2000).

A second longitudinal study in the Boston area found that children with a parental history of asthma who attended child care in the first year of life had significantly lower serum IgE levels at age two than children who did not attend child care, but no difference in frequency of wheezing at age 4. The authors concluded that the protective effect of child care attendance in early life against allergies and asthma had begun by age two (as indicated by the lower serum IgE levels), but protection against wheezing may not be discernible until after age four (Celadon, Litonjua, Ryan, Weiss and Gold, 2002).

Action Items for the CCHC

- Educate the child care staff about disease control.

- Encourage compliance with the child care staff regarding immunization requirements and hygienic recommendations.

- Use information to allay parents’/guardians’ fears about the long-term effects of illnesses in the child care environment.

Where to Find More Information

American Academy of Pediatrics

Healthy Futures: Curriculum for Managing Infectious Diseases in Early Education and Child Care Settings

<http://www.healthychildcare.org/HealthyFutures.html>

American Academy of Pediatrics

Red Book Online: Report of the Committee on Infectious Diseases

<http://aapredbook.aappublications.org/current.dtl>

American Lung Association

Flu Vaccine Finder

<http://www.lung.org/lung-disease/influenza/flu-vaccine-finder/>

American Public Health Association

<http://www.apha.org>

American Red Cross National Headquarters

<http://www.redcross.org/>

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California Childcare Health Program

Influenza and You: What You Need to Know

http://ucsfchildcarehealth.org/pdfs/healthandsafety/influenzaen081903_adr.pdf

Centers for Disease Control and Prevention

Influenza (Flu) Patient and Provider Education Materials

<http://www.cdc.gov/flu/freeresources/>

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http://ucsfchildcarehealth.org/pdfs/healthandsafety/recommenEN_adr.pdf

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Hayes EB, Piesman J. How can we prevent lyme disease? N Engl J Med 2003;348:2424-30.

Health Resources and Services Administration
Maternal and Child Health Bureau

<http://www.mchb.hrsa.gov/>

Healthy Child Care Pennsylvania
Diapering – A Dozen Common Errors

<http://www.ecels-healthychildcarepa.org/content/5-8-12%20Diapering-%20A%20dozen%20Common%20Errors%205-8-12%20rev.pdf>

Healthy Child Care Pennsylvania
Changing Soiled Underwear

<http://www.ecels-healthychildcarepa.org/content/2-11-10%20v2ChangingSoiledUnderwear.pdf>

HRSA Information Center

<http://www.ask.hrsa.gov/>

Jonathan B. Kotch, Patricia Isbell, David J. Weber, Viet Nguyen, Eric Savage, Elizabeth Gunn, Martie Skinner, Stephen Fowlkes, Jasveer Virk, and Jonnell Allen. Hand-Washing and Diapering Equipment Reduces Disease Among Children in Out-of-Home Child Care Centers Pediatrics, Jul 2007; 120: e29 - e36.

National Institute of Child Health & Human Development

<http://www.nichd.nih.gov/>

Nation's Network of Child Care Resource and Referral (NACCRRA)

<http://www.naccrra.org>

Nemours Foundation
KidsHealth for parents: Infections

<http://www.kidshealth.org/parent/infections/index.html>

Parents of Kids with Infectious Diseases

<http://www.pkids.org>

Pollack RJ. Head lice: Information and frequently asked questions. [online] 2000.
<http://www.warwick.ac.uk/teacherweb/facultyfiles/nweinhold/Harvard%20lice%20info.html>

Public Health Foundation
<http://www.phf.org/>

Red Book Online 2006
The Report of the Committee on Infectious Diseases, American Academy of Pediatrics
<http://aapredbook.aappublications.org/current.dtl>

Reducing Diarrheal Illness in the Child Care Center: A Workshop and Video Series. Chapel Hill, NC: University of North Carolina at Chapel Hill, School of Public Health, Departments of Epidemiology and Maternal and Child Health; n.d.

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Shope TR, Aronson S. Improving the health and safety of children in nonparental early education and child care. *Pediatr Rev* 2005;26(3):86-95.

USAID Health
Avian Influenza Situation Updates
http://transition.usaid.gov/our_work/global_health/home/News/news_items/actions.html

US Department of Commerce
National Technical Information Service
<http://www.ntis.gov/>

US Department of Health and Human Services
Pandemic Influenza Implementation Plan
<http://www.hhs.gov/pandemicflu/implementationplan/pdf/Pandemic.pdf>

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APPENDIX A: HANDWASHING POSITIVELY ASSOCIATED WITH FEWER HEALTH PROBLEMS IN CHILDREN

Handwashing Positively Associated with Fewer Health Problems in Children

The effect of handwashing has been positively associated with improved health in children in both industrialized and developing nations alike. Notable studies on the subject in the U.S. indicated that handwashing programs resulted in a 45% reduction in clinical visits for respiratory ailments. Research shows that worldwide each year more than 3.5million children die from diarrhea, acute lower respiratory-tract infection, and impetigo (a bacterial skin infection which usually affects children). In an independent study conducted in Karachi it was discovered that 41% of deaths of children under age five were linked to complications from diarrhea. The purpose of the current study was to assess the effect handwashing has on the prevalence of these illnesses. Researchers called this endeavor the Karachi Soap Health Study.

Methods

Researchers conducted the study in a squatter area of Karachi, Pakistan. Twenty communities within this region were chosen for the study; eleven were controls. Non-controls (300 families) were instructed to wash their hands with triclocarbon and plain soap several times per day. Research assistants made home visits for one year to assess and encourage continuation in the study.

Qualification for the study included having at least two children under the age of fifteen (one had to be younger than five years old) and intention to remain in the same place of residence for the duration of the study. Before initiation of the intervention families were presented with media in the form of slide shows, videos, and pamphlets to show the pros and cons of handwashing. In addition, researchers held community meetings with the families during the first three months of the study. Participants were encouraged to wash their hands after proximity to any activity related to defecation, before eating, before preparing food and before feeding infants. They were also instructed to bathe every day. Each family received bars of soap. Throughout the study researchers made health assessments of the children, controlling especially for symptoms of diarrhea, acute lower respiratory-tract infection, and impetigo.

Results

Children under age five were half as likely to develop pneumonia as the control population. Subjects age 15 and younger were 53% less likely to develop diarrhea and 34% less likely to develop impetigo than controls. Families which used plain soap or triclocarbon soap had similar positive outcomes.

Intervention subjects had significantly fewer instances of respiratory illness, impetigo and diarrhea than controls. Children under 15 had a 50% less chance of experiencing cough related illnesses. Children under age five who received soap were half as likely to develop pneumonia as those who didn't receive soap. Prevalence of acute respiratory illness was similar for families who received both plain soap and triclocarbon soap.

Conclusion and Discussion

Consistent handwashing in the squatter regions of Karachi, Pakistan significantly reduced the leading causes of childhood death—diarrhea, acute lower respiratory-tract infection, and impetigo. There were no noticeable differences among intervention families between the use plain soap and triclocarbon soap. Researchers said that the results of the study must be attributed to the soap intervention because all the study’s participants came from the same squatter region and had similar socioeconomic backgrounds.

Complete citation for the study:

Luby SP, Agboatwala M, Feikin DR, et al. (2005). Effect of handwashing on child health: a randomized controlled trial. *Lancet*; 366: 225-233