Consulting to Promote Environmental Health in Early Childhood Settings

Healthy Child Care Washington

Module Eight

Washington State Health Consultant Training Program

Washington State Health Consultant Training Program

A Project of Healthy Child Care Washington

Based on the University of North Carolina School of Public Health National Training Institute for Child Care Health Consultants Modules

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1. Rationale

Environmental health is a relatively new field of science, gaining government recognition in the 1970's. Over the last three decades, the field has grown so rapidly that it has outpaced attempts to organize it and as a result, is fragmented into many different agencies and departments. Environmental Health recommendations and results related to young children are particularly fragmented. This module attempts to summarize areas of concerns and issues for early childhood care providers related to environmental health issues in the care setting.

2. Learning Objectives

Participants will be able to:

- Describe the factors that make children uniquely vulnerable to environmental hazards,
- Identify the leading environmental health risks to children in the child care setting,
- Describe the effects of hazardous exposure on children's health and ways to prevent exposure and manage hazards,
- Identify preventive actions and community resources,
- Describe the ways Child Care Health Consultants can promote a healthy child care environment through program policy, health education, and community advocacy.

3. Introduction

3.1.Trends in Environmental Health

One hundred years ago, the major causes of death and illness in children were infectious diseases: pneumonia, influenza, measles, diphtheria, dysentery, and tetanus. In 1900, 10% of infants died before their first birthday. By the end of 2000, the rate of infant mortality had declined to less than one percent. Clearly, during this period, public health made astonishing strides in reducing health risks for American children. Yet, while some health risks have declined dramatically over the last century, new risks have emerged. Chronic diseases are now the leading cause of illness and death for children: asthma is the leading cause of hospitalization, and cancer is the leading cause of death.

Consider the following figures:

- Asthma rates for children have doubled in the last 15 years;

Childhood cancer rates have increased 10 percent over the last 20 years;

Rates of infants born with low birth weight have risen steadily since the 1980s despite prevention efforts (Pew Environmental Health Commission, 1999);

Rates of infants born with serious heart defects and urinary tract obstructions have risen 2.5 and 1.5 times respectively in the last decade.

Since World War II, thousands of new chemicals have been introduced into the environment. Only a fraction of these chemicals have received thorough testing for harm to human health, much less for toxicity to the child's developing brain. In addition, testing for developmental neurotoxicity is not required even in the registration or re-registration of pesticides, one of the strictest areas of chemical regulation. Many chemicals have never been tested at all. The Environmental Protection Agency (EPA) estimates that up to 28% of the approximately 80,000 chemicals currently in use have neurotoxic potential. Nearly 75% of the these chemicals have undergone little or no toxicity testing.

Scientists, policy-makers, and the public have raised particular concerns about children's exposure to environmental contaminants such as lead, mercury, and synthetic chemicals such as pesticides. Concerns have also surfaced about possible links between environmental exposures to common chemicals and asthma, cancer, autism, and other diseases that affect children. What is most problematic is that while low levels of exposure to many chemicals are unavoidable, scientists know little about the true risks of such exposures. In addition, scientists are frequently unable to distinguish which chemicals may potentially be dangerous because people are exposed to so many simultaneously.

The problem is that for most chemicals, we simply do not know how safe – or dangerous – they may be. And they are everywhere around us – in the air, soil, and water; in our homes; and in our bodies. Not a single child today is born free of synthetic chemicals.

Most often people think of the environment in terms of the *natural environment,* which includes soil, water, air, plants and the weather. However, other definitions of the environment focus on the *human-made environment,* which includes features such as housing, work, school, child care facilities, transportation, industry, and agriculture.

The focus of the environmental movement in the 1960s and 1970s was predominantly ecological, where concerns centered on human's negative effects on the natural world. This focus has shifted somewhat to environmental risks to human health, especially the health of children, and more recently, to risks associated with human-made environments: homes, schools, and work places. This latter shift has increased awareness of indoor air quality, pest control (insects, mildew, rodents, weeds), and building construction materials.

The principal factors influencing the effect of environmental toxins on human health are 1) the amount or degree of exposure to the toxin (dose), 2) the duration of the exposure, 3) the toxicity or strength of the toxin itself, and 4) organism factors, such as the age, sex, and health status of the person exposed. These concepts are important for understanding children's special vulnerability to environmental toxins because a number of child (organism) factors influence the amount and duration of toxins to which a child is exposed.

This module will focus on natural and human-made environmental health hazards that affect the health of children in the child care setting. The strategies and recommendations throughout this module are based largely on reviews published by Crain (2000); Sattler, et al (2001); Bearer (1995); American Academy of Pediatrics [AAP] (1999); and Mott, et al. (1997).

A glossary of environmental terms is presented in the Handouts section.

4. Children's Unique Vulnerability To Environmental Hazards

4.1.What the Child Care Health Consultant Needs to Know

Scientists are just beginning to discover how dangerous some environmental hazards are to human health, but one finding appears clear: children are far more susceptible to the effects of environmental hazards than adults. Like adults, children take in environmental toxins by ingesting them, inhaling them, or absorbing them through skin exposure. For example, children ingest the residue of pesticides, mercury, or other toxic agents in their food and/or drinking water; they breathe air pollutants such as asbestos or lead dust into their lungs, and they absorb solvents and cleaning solutions through their skin. However, unlike adults, certain characteristics of infants and young children increase the amount and duration of their exposure to the same toxins. Children's developmental characteristics and lifestyle increase their exposure to environmental toxins.

4.1.1.More Contact with the Ground

Because of their physiological immaturity and the type of developmental activities they engage in, infants and young children spend a large portion of their time closer to the ground than adults. Adults often place infants on floors/carpeting or grass to encourage movement and exploration. Once they can crawl, much of young children's play and activities take place on the floor, carpeting, grass, and playground surfaces. As a result, they have more exposure to toxins that are applied to or settle on these surfaces, such as formaldehyde and volatile organic chemical vapors from carpets, lead-based paint dust, cleaning product residues,

fertilizers, herbicides, and pesticides.

4.1.2.More Time Outdoors

Although the amount of time children spend outdoors may have decreased in recent years, they still spend relatively more time outdoors than adults; the time spent is more likely to be active, which requires deeper breathing. Children also breathe frequently through their mouths, bypassing nasal filtering. They also do their breathing closer to the ground where more pollutants tend to linger. An adult's “breathing zone” is at about the four - six foot height, while a child's is often at the one to two foot height. All of these characteristics make children more susceptible to any air pollutants in the environment than adults.

4.1.3.More Hand to Mouth Activity

Young children explore the world by putting things in their mouths. This developmentally appropriate behavior significantly increases their opportunity for direct ingestion of pollutants in dirt or dust such as lead-based paint dust and pesticide residue.

4.1.4.Less Varied Diet

A child's diet tends to be less varied than that of an adult. For example, the diet of infants is generally limited to breast milk or formula. The average one-year-old drinks twenty-one times more apple juice, eleven times more grape juice, and nearly five times more orange juice per unit of body weight than the average adult. Infants and children daily drink two and a half times, per unit of body weight, more water than adults. If these foods and fluids contain contaminants, children will have greater exposure than adults because these foods constitute a larger proportion of their diet.

4.1.5.Higher Metabolic Rate

Children’s biological immaturity increases their exposure to environmental toxins; because children are physically smaller than adults, and their metabolic rate (the energy expended by the body per unit time) is higher. As a result, they breathe more rapidly and take in proportionally more oxygen. Children’s rate of absorption of substances they consume or breathe is also higher than that of adults. This enhanced absorption can also significantly increase their intake of contaminants. Lead, when it is present, is absorbed in place of calcium; it is absorbed to a greater extent in children than in adults. An adult will absorb 10% of ingested lead, whereas a one- to two-year-old child will absorb 50% of ingested lead. This means that children’s relative dose of any pollutants available in air, food, or water would be greater than that for adults.

Because their metabolic systems are still developing, children are less capable of

counteracting toxic effects than adults. Adults have the blood-brain barrier that protects the brain from potentially toxic chemicals circulating through the body, but this barrier is not fully developed in infants until six months of age. Finally, children's respiratory passages are narrower than adults, meaning that irritation caused by air pollution can result in more airway obstruction.

4.1.6.Rapid organ development increases toxin effect

Children's exposure to environmental hazards during sensitive periods of rapid organ development may permanently alter the structure or function of that organ. In adults, organ growth has stabilized. The period of infancy and early childhood, however, is characterized by rapid organ development. Exposures to toxins during the time an organ is undergoing development may have drastic effects on the outcome of that development. For example, animal tests of pesticides show that even small, single doses during a critical 24-hour period of brain development can cause hyperactivity and permanent changes in neurotransmitter receptor levels in the brain.

4.2.The Role of the Child Care Health Consultant

An important role of the Child Care Health Consultant is to facilitate communication between child care providers and environmental health specialists. Child care issues must be highlighted for environmental health specialists, and environmental health information may need interpretation and clarification for child care providers. The perspective of the child care provider with respect to environmental health issues is stated eloquently by Gratz and Boulton (1993):

> "Even though we may not have the scientific background, we need to pay attention not as toxicologists, chemists, or environmental sanitation experts, but as those who make the children's and staff's well-being a first priority. As informed directors we need to be aware of the young child's heightened susceptibilities as well as our ongoing responsibilities to take care of children as best as we can when it comes to environmental hazards."

To accomplish this communication task, the Child Care Health Consultant must become familiar with and stay attuned to current trends and issues in the environmental health field, specifically including:

key environmental health concepts,

relationships between health and the environment,

the various ways people and disciplines define the environment, and

sensitivity to the perspective and needs of the child care staff regarding environmental issues and recommendations.

The understanding of children's unique vulnerabilities provides a powerful tool for

change. The role of the Child Care Health Consultant is to encourage and support this understanding among child care providers. The Child Care Health Consultant needs to be familiar with the unique characteristics that make children more at risk from environmental hazards than adults may be. The information in the preceding sections is important to convey to providers and parents. The supplemental materials at the end of this module detail various environmental hazards and possible steps to take to alleviate them.

5. The Worst Environmental Hazards for Children

There are a number of hazards that are particularly relevant for the child care setting. This next section addresses the most common of those and what to do about them.

Children are exposed to environmental contaminants every day, all day. Some risks, such as exposure to tobacco smoke, are relatively clear cut; whereas others, such as long term, low level exposures to many chemicals simultaneously, are more complex and difficult to demonstrate and therefore relatively untested. The risks from chemical exposure are estimated for one chemical at a time, while children are exposed to many toxicants in complex mixtures throughout their physical development. Multiple chemical exposures often interact to magnify damaging effects or cause new types of harm.

Among the hundreds of potential environmental risks present in today's world, the scientific community tends to agree with Mott et al. (1997) that the "five worst hazards" to the health of young children are: lead, air pollution, environmental tobacco smoke, pesticides, and drinking water contamination including septic system failures. These risks are presented in more detail below. For each risk, the section will address:

The source(s) of the pollutant in the child care environment,

Routes of exposure,

Health effects of exposure for young children,

Detection of the pollutant in the child care environment, and

What the CCHC Should do about the particular hazard for prevention and management.

5.1.Tobacco Smoke

Tobacco smoke has been thoroughly discussed in many documents and research studies. It will not be addressed in this document.

5.2.Air Polution

5.2.1.Air Quality

Within the last 20 years the interest in the quality of the indoor, as well as the outdoor, air we breathe has increased significantly. Most of us, even children, spend about 90 % of our time indoors where the concentration of pollutants may be much higher than it is out of doors. These pollutants come from a variety of sources: the building, from human or animal vectors, from commercial products, or from the earth itself.

While reducing energy costs, the improvements in housing/building design reduce airflow between inside and outside. As a result, indoor air pollutants are more likely to become trapped and accumulate to unhealthy levels. Also, new synthetic materials used in building construction, furnishings, and everyday household products introduce additional contaminants into the indoor environment. For example, durable press fabrics(draperies, carpets) and pressed wood and fiberboard furnishings (shelving, cabinets, furniture) can be sources of formaldehyde in the home.

Ventilation to remove or dilute indoor air is an effective method for decreasing the affect, but source control is the most effective way to decrease indoor air pollutants. (American Lung Association of Washington, Indoor Air Resource Guide for Washington State, Seattle,WA. 1995)

Some of the most common causes of air pollution in Washington State include:

asbestos,

biologicals (animal dander, molds, dust mites),

combustion products(stoves, space heaters, furnaces, fireplaces),

environmental tobacco smoke,

heavy metals (airborne lead, mercury vapor),

radon,

sick building syndrome,

volatile organic compounds (formaldehyde, pesticides, solvents, cleaning agents).

(American Lung Assn, EPA, CPSC, AMA, Indoor Air Polution, an introduction for Health Professionals, ND, Washington DC)

5.2.2.Outdoor Air

Outdoor air quality is influenced by chemicals and particles from sources such as factories, power plants, dry cleaners, cars, buses, trucks, agricultural activities,

and even windblown dust. The proximity of the child care facility to industrial or agricultural sites or highways, and the ambient air quality for the respective geographical region present the major hazards for outdoor air pollution. Ambient air quality has improved since the enactment of the Clean Air Act in 1970 and the Clean Air Act Amendments in 1990. Yet as recently as 1998, 23 percent of children still lived in areas that did not meet at least one of the Primary National Ambient Air Quality Standards. Approximately 1 million children lived in areas that did not meet the National Ambient Air Quality Standard for lead (Federal Interagency Forum on Child and Family Statistics, 2001). Emission standards have been developed for 189 known air pollutants, most notably: ozone (smog), breathable particulate matter, lead, sulfur dioxide, carbon monoxide and nitrogen oxides. However, only a few air pollutants are *regularly* monitored in assessments of air quality (AAP, 1999).

5.2.3.Indoor Air

The EPA and the U.S. Consumer Product Safety Commission (1995) warn that air within homes and other buildings is often more seriously polluted than the outdoor air in even the largest industrialized cities. This information, coupled with evidence that children spend as much as 90% of their time indoors, means that children's exposure to indoor air pollutants may be 2-5 times higher, sometimes 100 times higher, than their exposure to outdoor air pollutants (U.S. Department of Health and Human Services, 2000; EPA, 2002a). Relatively few studies of indoor air quality have been conducted in child care centers, but those that have tend to confirm this estimate. Daneault, Beausoleil, and Messing (1992) measured levels of carbon dioxide (CO_2), humidity, and temperature in 90% of child care centers in Montreal during winter afternoons. They found that levels of humidity and temperature generally fell within recommended ranges. However, 90% of the centers exceeded the recommended level of CO_2 (1000 parts per million [ppm]) at some point during the study, and 13% registered more than double the recommended level (at 2500 ppm). The average CO_2 level for all centers was 1505 ppm. The authors found that the levels of CO_2 were related to four factors:

the more children present and use of an electric heating system *increased* the level of CO_2;

the presence of a ventilation system and use of an older building (which tends to have more indoor/outdoor air circulation) reduced it.

In a second study, Li, Hsu, and Tai (1997) measured degrees of dampness and visible mold in 28 child care centers in Taiwan, a country with a subtropical climate. They found dampness in 72% of centers, visible mold in 23%, stuffy odors in 49%, and evidence of water damage and flooding in 41% and 51% respectively. The degree of dampness was positively related to the frequency of reported respiratory symptoms in the child care staff.

There are many resources available that describe the causes, signs, symptoms, and treatment of illness due to indoor air pollution and they are listed in the bibliography. Two that can be most helpful for Washington State residents are the *Indoor Air Resource Guide for Washington State* produced by the American Lung Association of Washington (1-800-LUNG-USA) and the *Indoor Air Polution Guide, an Introduction forHealth Professionals.*

5.2.4.The Role of the Child Care Health Consultant

Because each of the air pollution contaiminants has individual and specific signs, symptoms, and treatments, this document will not cover them in detail, but will refer you to the Environmental Health Department of the Local Health Jurisdiction for specifics related to the area of the state in which you live. The Environmental Health staff at the LHJ are current in the information that may be needed for particular situations that the CCHCs address in their practice.

5.3.Lead

5.3.1.What the Child Care Health Consultant Should Know

Research in the 1970s and 1980s demonstrated that seemingly healthy children with elevated levels of lead had lower IQ scores, more language difficulties, more attention problems, more behavior disorders than children with normal levels of lead. As a result, lead was removed from two major sources: gasoline in the mid 1970s, and house paint in 1978. Despite these actions, lead continues to be a major environmental health problem for America's children.

5.3.1.1.Primary Sources of lead in the child care environment

Lead is a highly toxic metal found in everyday items such as the aforementioned paint and lead tainted soil. Because it does not break down, lead persists in the environment. Pre-1978 paint products are still largely responsible for the continuing high concentrations of lead found in buildings and in the soil around buildings constructed before that time.

The U.S. Department of Housing and Urban Development [HUD] (1995) estimates that 75% of U.S. homes built before 1980 contain some lead-based paint, and the older the home, the greater the likelihood. Lead was a major ingredient in house paint before 1950, when some paint contained as much as 50% lead. *Lead paint is still the most important health hazard for children*.

Leaded paint that is intact, encapsulated, enclosed, or otherwise completely covered with non lead-based paint or another non-lead surface does not pose a problem as long as the covering paint is well maintained and surfaces are kept clean. Disturbance of lead-based paint during remodeling and renovation of older homes can pose high risks for lead exposure. Lead paint that is peeling or on deteriorating surfaces poses high risks.

The most common cause of lead poisoning in children is through ingestion of lead dust by normal hand-to-mouth activity. The lead-based paint deteriorates over time due to moisture, normal use, or disturbance during renovation projects, and the paint flakes or chips deteriorate into dust that may be so fine it cannot be seen with normal vision. Also, lead paint chips or flakes themselves are especially attractive because they taste sweet, like candy. Children cared for in older housing with deteriorated lead paint are considered at highest risk for lead exposure, followed by children whose parents are remodeling houses built before 1978.

The full extent of lead hazards in U.S. child care facilities has not been addressed by environmental agencies, but one could assume that facilities in buildings constructed before 1978, and especially those constructed before 1950, present relatively high risks for exposure.

5.3.1.2.Secondary Sources of Lead in the Environment

Some relevant secondary sources of lead that may add to exposure levels in the child care environment include:

drinking water contaminated from lead soldered pipes in the facility plumbing,

older and imported toys (especially those from developing countries),

arts and crafts materials,

old pottery (especially imported pottery) and pewter,

imported vinyl mini-blinds,

older outdoor playground equipment coated with lead-based paint, and

air borne lead from nearby industries that produce lead containing materials (e.g., smelters).

Children are exposed to lead primarily through hand-to-mouth activity. As they put their fingers or other objects in their mouths, they unintentionally ingest lead particles from the dust, paint, water, or soil. As mentioned earlier, they may be especially attracted to lead dust because of its sweet taste. They may also breathe lead contaminated air.

5.3.1.3.Health Effects of Lead Exposure

Lead poisoning affects every system in the body. Even at extremely low concentrations, it can affect a child's central nervous system, kidneys, and reproductive system. At higher levels, it can cause coma, convulsions, and death. Low levels of lead are associated with lower IQ scores, impaired neurobehavioral development, decreased stature, decreased growth, and impaired hearing acuity. Lead effects are permanent and continue to affect a child’s functioning throughout life.

5.3.2.Role of the Child Care Health Consultant

5.3.2.1.Detection of Lead Problems in the Child Care Environment

Except at extreme levels, lead poisoning usually *shows no obvious symptoms*. It can only be confirmed through direct blood testing (AAP, 1999; AAP, APHA, NRCHSCC [CFOC], 2002). For this reason, the AAP (1999) recommends that children who present certain risk factors be automatically screened for elevated blood lead levels. The following groups of children are recommended for testing:

Children in the first and second year of life who live in housing built prior to 1950.

Children living in poverty.

Children with developmental delays whose oral behaviors place them at risk.

Victims of abuse and neglect.

Children whose parents are exposed to lead.

Immigrant children, including adoptees.

Children who live in or regularly visit a house built before 1978 that is being or has been remodeled within the last 6 months.

Children who have a sibling or playmate who has or did have lead poisoning.

5.3.2.2.Identifying Lead Hazards in the Environment

Accurate detection of lead exposure risks in the environment requires professional expertise. Do-it-yourself spot test kits are available at home retail centers, and paint stores, but their sensitivity is limited. The current chemical spot test products are not recommended by the EPA or HUD. To locate a certified professional for lead testing, contact your state or local health department, or go to the website for the U.S. Department of Housing and Urban Development National Lead Service Providers' Listing System (http://www.leadlisting.org/). This site lists lead evaluation service providers and lead hazard control service providers by state.

A list of "checklist " resources appears in the resource section of this module.

5.4.Pesticides

5.4.1.What the Child Care Health Consultant Should Know

Usually we associate pesticides with insecticides – sprays or powders that kill bugs. The EPA definition, however, is much broader and defines pesticides as "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice, other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria, and viruses"

(EPA, 2002). In the United States, pesticides are big business. There are a very large number of pesticides in use today. The EPA has the responsibility of registering pesticides that are for sale. In 1999, there were almost 900 chemicals registered by the EPA as the active ingredients in pesticides. Many of these are designed to kill weeds. (Wigle, 2003) About 5 billion pounds of pesticides are used each year in the world. (Wigle, 2003) The EPA estimates that U.S. consumers alone spend nearly $2 billion annually for pesticides for home and garden use. “Pesticide products are used indoors in over 90% of U.S. households; the main types being insecticide bombs, broad cast applications (sprays), crack and crevice treatments, no-pest strips, pet shampoos, and flea collars.” (Wigle, 2003) Even if pesticides are not used in the home, pets and people often track in soil from outdoors that is contaminated with pesticides.

By their very nature, most pesticides create some risk of harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms. In 2000 alone, an estimated 73,000 children were involved in common household pesticide-related poisonings or exposures in the United States. An additional 25,153 children were exposed to or poisoned by household chlorine bleach.” (USEPA, 2003) Per the EPA Registered list, chlorine bleach is considered a pesticide because of its impact on mold. Health effects of pesticides depend on the type of the pesticide. Some affect the nervous system, others irritate the skin or eyes. Others may cause cancer and others affect the body’s hormones. (USEPA, 2003)

In other words, what is poisonous to bugs and animals is also poisonous to humans. Pesticides are “registered” and not “approved.” Registration does not guarantee safety. “The fact that a pesticide is registered by the EPA does not mean that it is safe; it simply means that standards have been established to minimize the risks associated with its use (pesticides) can pose health risks even when used and applied in full compliance with manufacturers' recommendations and legal requirements” (Office of the New York State Attorney General, 2000).

The Washington State Department of Agriculture developed, and the state legislature passed, a pesticide law in June of 2002 that requires all licensed child care centers and school facilities to abide by the new pesticide notification laws. The law requires annual notification of pest control policies/methods and pre-notification for interested parties at least 48 hours before preparation.

Note: Although disinfectants and sanitizers are technically pesticides and have been given an EPA registration number, the pesticide notification law does not apply to them. A Model Pesticide Policy for Child Care Providers was developed by the Seattle-King Child Care Health Program to help providers understand what was expected of them and to provide a policy template for child care facilities to use to help them comply with the law. It can be accessed on their website; URL: http://www.metrokc.gov/health/childcare/mhp/index.htm

With the exception of poison baits, as little as one per cent of pesticides applied indoors reach the targeted pest. The rest contaminate surfaces and air in the treated environment. Outdoor pesticides may fall on non-targeted organisms, plants, animals, outdoor furniture, and play areas. They may also contaminate groundwater, rivers, or wells.

Natural enemies to other potential pests may also be killed or drastically reduced in number. Thus a secondary pest may rapidly multiply in the absence of former competitors, parasites, and predators. More than 600 pest insects, weeds, and plant pathogens are now resistant to one or more pesticides. Once a pest has developed resistance to one class of chemicals, often it will develop resistance to others.

In addition, some pesticides, such as the insecticide DDT, can remain in the soil for over 20 years. Although banned in the United States in 1973, children can still be exposed to this chemical through touching contaminated soil, eating foods grown in contaminated soil, or eating fish from contaminated waters. DDT continues to be used in some developing countries, including those exporting food to the United States. Alternatives to pesticide use would include:

identify and find the source,

store food in airtight containers, do not leave pet food out, keep your environment clean, fix water leaks quickly, do not allow water to fill containers outside, plug cracks and holes in exterior walls/foundation/crawl-space, remove sources of harborage such as wood piles etc.,

physical controls such as window screens help keep out bugs, sticky flypaper without chemicals can trap them, use snap traps for rodents, and a vacuum for spiders,

use the least toxic chemical (but this should be your last resort),

hire a Pest-Control Operator (PCO) to help resolve a pest problem and to help create a pest management program.

5.4.1.1.Sources of Pesticides Outdoors

Residential/Community Spraying: Children who live and play in or near areas which receive commercial pesticide spraying are at higher risk of exposure to pesticides in the air, dust, and soil. For example, chemicals from aerial spraying of agricultural crops can drift into residential and business areas. Golf courses use herbicides to keep weeds from invading their grass surfaces. Power companies often spray herbicides under transmission and distribution power lines to keep unwanted vegetation from interfering with the company's ability to maintain the lines. In 1995, homeowners used nearly 133 million pounds of pesticides, herbicides, and fertilizers on their lawns and gardens alone. Young children are at greater risk for exposure to lawn and garden pesticides because children's crawling and play behaviors increase their contact with grass and ground surfaces and children's hand-to-mouth behaviors make it more likely that they will ingest pesticide residues from their hands. Because the body's mechanisms for removing toxic chemicals does not fully mature until the child is five years old, many chemicals may cause much more harm to a young child than to an adult. (Wigle, 2003) There is only very limited evidence to indicate definitive risks to children such a birth defects, developmental neurotoxicity, and childhood cancers. Scientists can only make hypotheses about the effects. They have suggested links to social and emotional developmental deficits, autism, leukemia, and brain cancer. (Wiggle, 2003)

Playgrounds: Chromated copper arsenate (CCA) is a mixture of three chemical pesticidal compounds used as a wood preservative – arsenic, chromium, and copper. (USEPA, 2003) CCA has been used since the 1930's and was the primary preservative begining in the 1970's. (CPSC 2003)

Most wooden playground structures, picnic tables, and decks are made of treated wood that has been injected with CCA. During treatment, the CCA is fixed to the wood rendering the chemical insoluble and resistant to leaching. (ACSH 2003) It is difficult to distinguish CCA-treated wood from other wood. Playground equipment made with CCA is subject to Consumer Product Safety Commission jurisdiction and their Federal Hazardous Substance Act. (CPSC 2003) This preservative protects the lumber against termites, beetles, and rot, however, arsenic is a known human carcinogen (a substance or agent that is known to cause cancer). Over time, investigations show that the arsenic in the CCA slowly leaches from the treated wood although it is treated to prevent leaching. (USEPA, 2003)> The rate and amount of arsenic that leaches from wood depends on the climate, acidity of the soil, amount of rain, the age of wood, and the level of CCA present.

A child's primary exposure route to arsenic would be hand-to-mouth behavior; very little arsenic is taken up through the skin. The exposure to the child depends on the number of days they play on the equipment each year, number of years they play on the play set, the amount of arsenic picked up on their hands, and the

amount of arsenic they ingest from their hands,(CPSC 2003) On February 12, 2002, the EPA announced that the lumber industry had voluntarily decided to shift from CCA preservatives in favor of preservatives that do not contain arsenic for all residential uses by December 31, 2003. 'Residential uses' would include wood used for playground equipment, decks, picnic tables, landscaping timbers, residential fencing, patios, and walkways, etc. Since January 1, 2004, the EPA has restricted CCA products to be used for wood intended for residential use by federal law. (USEPA, 2003) Older structures built with CCA treated wood (including those in child care settings) are not affected by this action.

Jahn and Payne (2002) suggest some alternatives to replacement of CCA treated wood. They note that three types of wood coatings were very effective in reducing the leaching of CCA from treated wood to levels well below the EPA's drinking water standard for arsenic. However, the tests made on these coatings consisted of rain simulation only and did not include tests of normal deterioration through wear and tear. These three types of coatings and one covering are:

latex primer followed by one coat of outdoor latex paint,

oil-based primer followed by one coat of oil-based paint, or

two coats of a penetrating oil semi-transparent deck stain,

untreated wood such as cedar and redwood, (USEPA, 2003)

Insect repellents: insect repellants are designed for application to human skin to *repel* insects rather than kill them. DEET is the active ingredient in most insect repellents. DEET is toxic when ingested, and high concentrations applied to the skin can cause blistering. For children, the CDC and EPA recommend using repellents containing no more than 10% DEET. DEET repellents should be used very sparingly on children aged 2-12 years of age and not at all on infants and children under age two. DEET must not be applied directly to children. Apply the DEET to your own hands and then put it on the child. DEET is effective for approximately 4 hours. Avoid prolonged or excessive use of DEET. Use this product sparingly to cover exposed skin and clothing. Do not apply to skin covered by clothing. Insect repellents should not be applied to children's hands to avoid ingestion. Wash all treated skin and clothing with soap and water after returning indoors.

More natural insecticides, such as citronella (e.g., Avon's Skin-So-Soft® bath oil) and soybean oil, are not as effective as DEET in preventing insect bites and also require more frequent reapplication. The safety of repeated applications of natural insect repellents on children has not been determined, and providers should not confuse the term "natural" with "safe" when using these products on children (Schneider and Freeman, 2000). More information on DEET is available from the U.S. Environmental Protection Agency, Pesticides and Topical Chemical Fact Sheet: Re-registration of the Insect Repellant DEET, 1998 at:

http://www.epa.gov/pesticides/factsheets/chemicals/deet.htm

5.4.1.2.Sources of Pesticides Indoors

Generally, indoor environments have higher concentrations of pesticides than outdoor environments because some are used indoors and others are tracked indoors from outside soil on shoes and pets (EPA,1990). Residue from both indoor and outdoor pesticide treatments has been found in carpet dust days and weeks after the pesticide application. Pesticides persist longer in indoor environments because indoor environments lack exposure to sun and rain, which helps to dilute pesticides and break them down.

Household Products: In addition to insecticides, common indoor pesticides include cleaning products such as disinfectants (for germs) and fungicides (for mold and mildew).

Food: The AAP (1999) notes that, worldwide, pesticides are not only used extensively during crop production, but also during the shipping and storage of foods. Wiles and Campbell (1995) analyzed some of young children's favorite foods (e.g., fruit and fruit juices, milk, wheat and oats) and detected pesticide residues in 50%. Foods are also likely to bear more than one pesticide. Even processed baby foods can contain some pesticide residues (AAP, 1999). The EPA sets standards for allowable levels of pesticides in foods. The Food and Drug Administration and the USDA Food Safety Inspection Service monitor pesticide residues in the food supply. In 1996 the Food Quality Protection Act was passed which provided additional assurances of pesticide safe food for infants and young children. This act "codifies the most explicit and stringent protection of children ever adopted in a federal environmental law" (Mott et al., 1997). It requires the EPA to consider *cumulative* risk of pesticide exposure from *all* sources (food, water, air) when evaluating pesticide safety.

Drinking Water: Drinking water is vulnerable to pollution by agricultural chemicals, pesticides, herbicides, and fungicides. Child care facilities that rely on wells for drinking water are especially at risk. The well water could become contaminated by pesticide residues and from runoff and seepage from neighboring farms.

Pets Children who play with pets treated for fleas, ticks, and other pests can be exposed to pesticides. Flea collars, shampoos, soaps, sprays, dusts, powders, and dips usually contain an insecticide.

5.4.1.3.Health Effects of Pesticide Exposure

Acute: Acute effects of pesticides range from irritation of the eyes, nose, and throat, mild dizziness, nausea, vomiting, diarrhea, headaches, and skin rashes, to severe illness and death (AAP, 1999). More severe reactions usually result from massive doses in accidental poisoning, chemical spills, inappropriate

application, or prolonged exposure.

Chronic: Damage to nervous system, reproductive system, endocrine system, immune system; cancer; chronic injury to the lungs, liver, and kidneys; and birth defects have all been associated with pesticide exposure. For children specifically, pesticides have been associated with brain cancers and childhood leukemia (AAP, 1999). Long term effects of pesticides depend upon toxicity of the pesticide itself, the length of exposure, and/or the amount of exposure.

5.4.1.4.Detection of Pesticide Problems in the Child Care Environment

Symptoms of pesticide exposure, both acute and chronic, are usually too non-specific to be useful for the detection of pesticide problems. They can be easily missed because they are so similar to those of common conditions such as influenza. The AAP (1999) reports that even laboratory tests are often not diagnostically useful. Resources for environmental checklists that may help detect possible pesticide exposure are provided at the end of this module.

5.4.2.The Role of the Child Care Health Consultant

Suggested precautions for child care sites with older chemically treated play equipment and outdoor furniture would be:

Wash hands thoroughly after contact with any wood (e.g. immediately after playing on CCA-treated playsets), especially prior to eating and drinking. (USEPA, 2003,CPSC 2003)

Food should not come into direct contact with treated wood, cover CCA-treated picnic tables with a plastic coated tablecloth, and avoid eating while playing on CCA-treated playgrounds. (USEPA, 2003, CPSC 2003)

Apply a penetrating coating product (e.g. oil-based semi-transparent stain, polyurethane or other hard lacquer) on a regular basis (annually or bi-annually), which may help reduce the migration of wood preservative chemicals. (USEPA 2003, CPSC 2003)

Sanding, sawing, and machining CCA-treated wood should be done outside wearing a dust mask, goggles, and gloves. Clean up all sawdust and scraps thoroughly. Dispose of CCA wood, sawdust, and scraps in the municipal garbage (not yard waste). Do not burn, compost, or mulch CCA-treated wood, scraps, or sawdust. (USEPA, 2003)

Non-wood alternatives such as plastics, metal, and composite materials. (USEPA, 2003)

Wash all exposed areas of body, especially hands, with soap and water after working with CCA-treated wood. Wash work clothes separately from other household clothing before wearing again. (USEPA, 2003)

Contact your local health department, or the Center for Disease Control and Prevention (CDC)l office of the Environmental Protection Agency (EPA) to obtain information pertinent to your locale.

Include this information in any policies you develop.

5.5.Water Pollution

5.5.1.What the Child Care Health Consultant Should Know

Of the earth's water, only three per cent is fresh, and of that three per cent, only one per cent is available for human use. Clearly, water is a precious and relatively rare resource whose preservation is essential to public health and survival. The United States obtains approximately half of its drinking water from ground water (underground aquifers) and the other half from surface water (rivers and lakes) or mixed surface and ground water sources.

The United States has one of the safest water supplies in the world. It is safe to drink water from virtually every public water system in the country. However, the *quality* of drinking water may vary in different sections of the country depending upon the state or municipality regulating the water supply. Water suppliers are bound by law to notify customers immediately if contamination poses an urgent health threat. These federal standards apply to all water suppliers serving 25 or more consumers, but not to smaller suppliers or to private wells. However, some states and municipalities have standards that apply to wells. Otherwise, people receiving water from private wells are responsible for making sure their own drinking water is safe.

5.5.1.1.Sources of Water Pollution

Hundreds of biological agents ((bacteria, viruses, parasites) and literally thousands of chemicals are found in fresh water supplies. As the AAP (1999) points out, "water and sediments in water are the ultimate sinks for most chemicals produced and used by humans".

Public Water Supplies In most cases, contaminants in public water supplies are at levels that do not pose immediate threats to public health. Serious drinking water contaminations do occur, but they are infrequent and usually of short duration. Most often, serious contamination is caused by treatment problems or extreme weather events. For example, if a public water system obtains water from a highly contaminated river, lake, or ground water well, it may have difficulty treating the water to meet safety standards.

Well Water: As mentioned earlier, private wells are not federally regulated and must be maintained by the homeowner. The AAP (1999) notes that "contamination of well water may occur if the well is shallow, in porous soil, old, poorly maintained, near a leaky septic tank or downhill from agricultural fields or intensive livestock operations".

There are two main types of wells that the child care consultant may encounter: A d**ug well** is a large dug hole in the ground, encased with concrete tiles to keep the sides from caving in. It is easily recognizable by its large concrete lid. Due to its shallow depth and larger surface diameter, the dug well is susceptible to contamination from surface water intrusion or from creatures such as insects, slugs, and rodents entering the well through a damaged well lid/seal. A **drilled well** is machine dug with a depth up to 300 feet deep and a diameter of 6 inches. The well head can either be found in a well house having a flat lid with pipes protruding from it or it may be located somewhere else on the property and should have a submersible cap on it.

Wells in Washington state have been broken down into three categories: Group A System, Group B System, and the individual well. A very general definition of a **Group A water system** is a system with 15 or more connections or serving 25 or more individuals (e.g. child care center). Depending on the county, the regulatory agency for Group A water systems may be the Department of Health or the local health jurisdiction (LHJ). A **Group B water system** would be associated with child care centers that have less than 25 individuals on site and all family home child cares. An **individual well** is a well serving a single family home. Many family home child care will be in homes that have an individual/private well. Once the child care is licensed, it becomes a business and that changes the status of a water system from residential to commercial (Group B). This is a problem because requirements for a Group B well, in terms of the well site, well seal, and initial testing, are a lot stricter than for an individual well and meeting those more strict regulations may pose a severe hardship for the homeowner. How to address water systems in relationship to family child care homes continues to be a dilemma for DOH and LHJs. Many LHJs are hesitant to address this issue. The DOH is currently in the process of collecting data on child care sites with residential wells to determine what the next course of action will be in the effort to ensure regulatory consistency with individual wells and Group B water systems throughout Washington State.

Septic Tanks

Households that are not served by public sewers usually depend on septic tank systems to treat and dispose of wastewater. A well designed, installed, and maintained septic system can provide years of reliable low-cost service. When these systems fail to operate effectively, property damage, groundwater pollution, surface water pollution, and disease outbreaks can occur. (WSDOH 1996)

There are many different types of septic tank systems to fit a wide range of soil and site conditions. A “conventional” septic tank system has three working components: the septic tank, the drainfield with its replacement area and the surrounding soil. (WSDOH 1996)

The typical septic tank is a large buried rectangular, or cylindrical container made of concrete, fiberglass, or polyethylene. Wastewater from the toilet, bath, kitchen, laundry, etc. flows into the tank. Heavy solids settle to the bottom where bacterial action partially decomposes them to digested sludge and gases. All tanks should have accessible covers for checking the condition of the baffles and for pumping both compartments. Solids that are not decomposed remain in the septic tank. If not removed by periodic pumping, solids will accumulate until they eventually overflow into the drainfield.

Most septic tanks need to be pumped every 3 to 5 years, depending on the tank size, and the amount and type of solids entering the tank. Some septic tank additives on the market, with chemicals, yeast, bacteria, or enzymes claim to prevent clogged drains or reduce the need for routine pumping. Such products are not necessary for the proper functioning of a septic tank. Some can cause solids to carry over to the drainfield, which results in early clogging and the need for a new drainfield. Products containing organic solvents contribute to groundwater pollution. The wastewater leaving the septic tank is a liquid called effluent. It has been partially treated but still contains disease-causing bacteria and other pollutants. Discharging effluent onto the ground’s surface or onto surface and groundwater is against Washington State Law. (WSDOH 1996)

The drainfield receives septic tank effluent. It has a network of perforated pipes laid in gravel-filled trenches (2-3 feet wide), or beds (over 3 feet wide) in the soil. Wastewater trickles out of the pipes, through the gravel layer, and into the soil. The size and type of drainfield depends on the estimated daily wastewater flow and soil conditions. Every new drainfield is required to have a designated replacement area. It must be maintained should the existing system need an addition or repair. (WSDOH 1996)

The soil below the drainfield provides the final treatment and disposal of the septic tank effluent. After the effluent has passed into the soil, most of it percolates downward and outward, eventually entering the groundwater. A small percentage is taken up by plants through their roots, or evaporates from the soil. The soil filters effluent as it passes through the pore spaces. Chemical and biological processes treat the effluent before it reaches groundwater, or a restrictive layer, such as hardpan, bedrock or clay soils. These processes work best where the soil is somewhat dry, permeable, and contains plenty of oxygen for several feet below the drainfield.(WSDOH 1996)

Septic systems for residential use are designed based on use (i.e. those designed for a single family residence are to be used only for single family

residence). The systems are also designed based on the number of bedrooms in a house, assuming two individuals per bedroom. This has posed a challenge for the local health jurisdiction in evaluating if an on-site septic system would be adequate enough to meet the needs of a family home child care. For example, if a septic system was designed for a three bedroom house (maximum of six people) and currently, four individuals are living at that site, the proposed child care should technically take care of only two additional children to be within the recommended person vs. bedroom ratio. In most cases, family home child care providers are being licensed for 6-12 children on similar septic systems. Local health jurisdictions are concerned that the existing septic system may not be adequate to meet the additional wastewater load. LHJ's are also concermed about the possibility of a potential scenario for a septic system failure.

Septic failure are often due to: First, excessive water use (e.g. leaking plumbing fixtures, increased laundry, more people in the home than the drainfield was designed for, etc.), Second, physical damage to the system due to parking over the septic drainfield, digging in the drainfield area, tree roots in the drainfield, etc. Third, inadequate maintenance of the existing on-site septic system by not pumping the septic tank frequently enough, etc. The warning signs of a septic system failure would be: odors, surfacing sewage, wet spots, or lush vegetation growth in the drainfield area; plumbing or septic tank backups, slow draining fixtures; and gurgling sounds in the plumbing system.

5.5.1.2.General Routes of Exposure To Water Pollution

Children are exposed to water pollutants through drinking contaminated water; eating raw foods (carrots, tomatoes) irrigated or rinsed with contaminated water, eating fish or shellfish from polluted water, or through skin exposure from swimming/wading in polluted water (AAP, 1999).

Depending on the county, the detection and the level of contamination within a well are determined through well water testing. Most counties obtain well water samples in order to test for coliform bacteria, nitrate, and possibly for arsenic if the soil in the county is known to contain it. Contamination of the well water is usually due to surface water intrusion or from creatures such as insects, slugs, and rodents entering the well through a damaged well lid or seal.

5.5.1.3.Health Effects of Exposure to Water Pollution

Microbial contaminants: Acute reactions to water pollutants are usually due to microbial contaminants (e.g., bacteria and viruses) and may include vomiting or diarrhea. Long-term exposure to some pollutants, such as pesticides, minerals, and solvents, at levels above standards may cause gastrointestinal problems, skin irritations, cancer, reproductive problems and developmental problems, and other chronic health effects (AAP,1999). For most water pollutants little is known of long-term health effects.

Coliform bacteria come from natural sources, including soil, vegetation, human waste, and animal waste. Feces may carry organisms that cause disease. Coliform bacteria indicates that surface water is getting into the well or that the water may be contaminated with disease-causing organisms. Boiling the water and using commercially bottled water has been a temporary measure to provide potable water to the child care until a satisfactory well water sample is obtained.

Nitrate is highly soluble in water. If nitrates are found in the well water, it indicates water intrusion from sources such as fertilizers, animal manure, decomposing vegetation, and septic systems. High levels may be common in agricultural areas. Nitrate levels exceeding the maximum contaminant level of 10 mg/L could create a condition in infants called Methemoglobinemia ("Blue Baby Syndrome"). This condition is caused when nitrates are converted in the body to nitrites. The nitrites then bind very tightly to hemoglobin in the blood, making it less able to carry oxygen. The young infant turns blue because their tissues lack oxygen. The nitrate levels are not eliminated by boiling the water, it actually makes it more concentrated. The level of nitrates in ground water may vary from one point of time to another; therefore, periodic testing is recommended. Boiling, filters, and water softeners will not remove nitrates from the water.

Arsenic is naturally found in patches in the ground in certain areas of Washington State. It was also used as a wood preservative and was found in early pesticides. High doses cause abdominal pain and vomiting and can damage kidneys, blood vessels, and nerves, with prolonged exposure being associated with some cancers. On October 31, 2001, the EPA lowered the allowable level of arsenic from 50 ppb to 10 ppb. Elevated arsenic levels would have to be assessed by the local health jurisdiction to determine the most feasible well water treatment.

5.5.1.4.Detection of Water Pollution Problems in the Child Care Environment

Even with state of the art water treatment systems, sporadic and epidemic waterborne illnesses can occur. The AAP (1999) reports that the most prominent symptoms of such illnesses are mild gastroenteritis with diarrhea. While these symptoms are often nonspecific as to source, an outbreak of such symptoms in the child care center may indicate water contamination.

To determine the water quality of an existing well, a well water sample must be obtained and assessed by a laboratory specializing in water monitoring. Recommended water testing for residential wells would be annually for coliform bacteria and every three years for nitrate and arsenic (if applicable). The child care consultant should contact the local health jurisdiction for additional recommendations on testing parameters to ensure that the existing well meets the water quality standards for that county. Well water samples must be properly obtained to ensure that a false test result is not obtained. It is critical that the

water sample is correctly retrieved from the well. If the individual taking the sample contaminates the water bottle, an unsatisfactory test result may occur even if the existing well water is fine. The opposite may also occur. Water bottles can be obtained from the local health jurisdiction or by a local water lab. Clear instructions on how to correctly obtain a well water sample must be closely followed by the individual taking the water sample.

5.5.2.The Role of the Child Care Health Consultant

There are preventive measures to help keep contaminants out of a well. First, the well should be sealed to keep water intrusion or organic matter out. There should not be evidence of holes in the casing or in the well lid (i.e. such as where wires pass through). The area around the well should be sealed with concrete for a dug well or bentonite for a drilled well. Second, keep sources of contamination 100 feet away from the well (e.g. resident/neighbor septic system, animal pens/pastures, manure piles, old vehicles, fields/gardens where pesticides are used etc.). Third, avoid storing chemicals in the well house. Spills or possibly even fumes could contaminate the drinking water from the well.

Table 7, in the handout section of this module, presents an inventory of specific water pollution hazards to look for in the child care environment and summarizes specific actions for management and prevention of exposures recommended by the CFOC (2002), AAP (1999), EPA (1999b), and Mott et al. (1997).

To ensure safe drinking water from a residential well, the child care consultant should implement the following procedures:

Emphasize the need for annual testing for bacteria of all residential child care wells.

Assess the well and the well site (by the local health jurisdiction, Environmental Health) to determine potential contamination sources.

The Environmental Health section of the local health jurisdiction will be an invaluable resource for the child care consultant on existing private water systems.

It is highly recommended that the Child Care Health Consultant build a relationship with the Water and Wastewater Program of the local health jurisdiction to help address potential concerns regarding family home child care on-site septic systems. The Water and Wastewater Program within a local health jurisdiction is the regulatory agency for on-site septic systems. Their role is to review and permit on-site sewage disposal systems, respond to complaints of failing sewage disposal systems, and communicate with the public regarding technical information. (Washington State Department of Health. Understanding and Caring For Your Septic System. DOH Pub 334-009 (2/96)).

6. Risk Assessment

Provocative information regarding environmental hazards appears almost daily in the media. In assessing such information, the CCHC should keep the following cautions in mind:

Where is the information coming from and is the source trustworthy?

How many studies back up a finding of an association between an environmental substance and its harmful effect?

How strong is the association between the apparently harmful substance and the effect created?

Does increasing the "dose" or exposure of the toxin increase the chance of harmful effects?

Does the harmful effect produced make sense given what we know about human biology?

With respect to preventing environmental risks in child care settings, Fiene summarizes current thinking in the following statement:

> "Risk cannot be entirely eliminated in any environment, but it can be significantly reduced. 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 (Fienne, 2002 p. 93)."

6.1.What the Child Care Health Consultant Needs to Know

The sheer volume and ever-changing nature of environmental risk information can be overwhelming. The Child Care Health Consultant's role is to assist the child care provider in:

Identifying and prioritizing the *key* environmental hazards that child care programs should address,

Establishing policies for managing these hazards, and

Developing strategies for implementing the policies.

Knowledge of Risks and Resources

Necessary components of the Child Care Health Consultant's role are described below.

First, the Child Care Health Consultant must know the environmental risks and

resources for his/her area. For example, what environmental hazards are regularly measured and tracked in the area? How is the this information publicized? Through local news media? Washington State Department of Environmental Protection? Where is the nearest EPA regional office and what is their contact information?

As evident in preceding sections, identification of environmental risks and preventive actions often requires expert support. To perform his/her job well, the Child Care Health Consultant must be aware of local and state environmental resources and maintain a close association with them. In fact, the area of environmental health is expanding so rapidly and becoming so specialized that the Child Care Health Consultant will probably need to field a variety of expert resources to cover the areas of concern to child care. An expert in lead prevention may not be adequately informed to address concerns or offer advice on pesticide hazards.

Thompson (2000) asks parents and others to keep 10 points in mind as they consider environmental health information reported in the media:

1. Life will never be risk free There is no such thing as zero risk. We all face innumerable risks every day. For example, We risk the possibility of choking or food poisoning every time we eat. And We risk an injury every time we ride in a car.
2. Risks for children and adults differ. Some substances and exposures are riskier for children. Others are riskier for adults.
3. The amount of exposure to the hazard and how exposure occurs matter. For most substances, when the exposure is very low, the chances of an impact are also very low. The manner of exposure also makes a difference. A child can be harmed by eating a single cigarette, but smoking a single cigarette during a lifetime is unlikely to cause harm.
4. Testing substances in animals gives useful, but imperfect, information about the effects of substances in humans. Toxicity tests typically use small numbers of animals that are given large amounts of the substance to ensure that an effect will be seen. This does not necessarily mean that effects will occur for humans in the amounts a human typically consumes or is otherwise exposed to.
5. We all want safe products. Responsible manufacturers want safe products too. They must consider their liability if they produce an unsafe product.
6. Some really important risks for children do not make enough news. Some of the biggest risks, guns and child abuse and neglect, are so common they are considered not newsworthy.
7. Some speculative, minor risks for children make too much news. Bisphenol-A in baby bottles and phthalates in children's toys recently made headlines. In both cases, risk assessments suggested very small and uncertain potential risks. The Internet in particular allows the rapid spread of anonymous, uncredited information.
8. It is never too soon to start teaching children about risks. We must teach children to manage risk, to be cautious but not unduly afraid.
9. The media itself can impose risks. The media reduces stories to sound bites to make headlines, but there is often much more to the story. Setting personal priorities based on the "health news of the day" can result in an unjustified fear of unlikely hazards and lack of sufficient concern about known hazards.
10. We need to work together. Everyone has a role to play, including Child Care Health Consultant's and child care providers.

6.2.Role of the Child Care Health Consultant

6.2.1.Assessment of Environmental Health Risks

A major role of the Child Care Health Consultant is to help providers assess actual and potential environmental risks in the child care setting. In addition to adequate knowledge of the risks, strong observational and interviewing skills are critical for this task. HCCW is not aware of any comprehensive environmental health assessment tools specific to child care, but the resources at the end of this module may provide a starting point for developing such a tool.

In addition, they must view media information about environmental hazards with an objective eye.

In communication with the provider, the Child Care Health Consultant should bear in mind that perceptions of risk can be influenced by many factors. Sandman (2000) notes that sensitivity to environmental health risks is influenced by the familiarity of the source of pollution and locus of control factors. For example “a household product, however carcinogenic, seems a lot less risky than a high-tech hazardous waste treatment facility because the former is familiar and under one’s own control, while the latter is exotic and controlled by others” (Sandman, 2000).

6.2.2.Policy Development

Finally, the Child Care Health Consultant should assist the child care staff in developing policies and procedures that will minimize exposure to environmental hazards, and in developing practical and specific means for insuring that those policies are appropriately and consistently carried out. These should include policies on lead exposure, sun exposure and exposures to the hazards listed in this module.

6.2.3.Advocacy

By the very nature of the services they perform, Child Care Health Consultants are perceived as trusted members of the community who have the best interests of children and families at heart. As such, they are well positioned to encourage and support good environmental practices in child care facilities, the community, and the state. Child advocacy is at the center of the Child Care Health Consultant job description. In the field of environmental health there is much work for the Child Care Health Consultant to do. Just a few examples are presented below.

In the child care facility, the Child Care Health Consultant can:

- Incorporate environmental themes into educational presentations and activities for both providers and parents.

Work with child care staff to make child care facilities models of effective Integrated Pest Management techniques.

In the community, the Child Care Health Consultant can:

Advocate for a healthier community water supply. Network with local agencies and groups to learn about the source of your drinking water, and get involved in activities to protect it.

Advocate for an expanded organic foods sections in local grocery stores.

Ask the local school board about pest control policies in schools and encourage the adoption of Integrated Pest Management techniques.

Petition local authorities to create a community pesticide sensitivity list requiring notification of vulnerable populations of significant outdoor commercial or residential pesticide applications.

Work with local parks and recreation associations to investigate the status of any public playground structures treated with CCA.

Work with local authorities to restrict/reduce community sanctioned spraying of pesticides both within the community and in surrounding areas.

Network with local authorities to improve air quality in your community.

Discover the sources of major air pollutants.

In the state, the Child Care Health Consultant can:

Petition state pesticide officials to create a state-wide pesticide sensitivity list.

Petition for removal or management of lead paint in lower income neighborhoods.

Monitor legislation on environmental issues that affect children. Develop mechanisms (e.g., advocacy groups) for actively supporting legislation that protects children and opposes legislation that may incur harm.

6.2.4.Cultural Implications

Hazardous materials are equally dangerous for all children and families, although some cultures may not recognize the same concerns that other cultures have. Educational materials about environmental hazardous in various languages are important to have available for families.

6.2.5.Implications For Children and Families

Environmental hazardous may have devastating effects on both children and families if they are exposed to them either in their homes or in the child care. It is important for the child care site to assure that environmental hazardous are eliminated, addressed or reduced according to recommendations made by

reputable agencies.

6.2.6.Implications for the Child Care Provider

This is one of many concerns that must be addressed by child care providers and may be a financial burden as more information is learned about the effects of environmental hazards on children. Policies need to be in place and educational information must be available to provide a safe environment for children.

Handouts

MODULE EIGHT
CONSULTING TO PROMOTE ENVIRONMENTAL HEALTH IN EARLY CHILDHOOD SETTINGS

Glossary of Environmental Terms

Abatement: Reducing the degree or intensity of, or eliminating, pollution.

Active ingredient: In any pesticide product, the component that kills, or otherwise controls, targets

Pests. Pesticides are regulated primarily on the basis of active ingredients.

Acute chemical poisoning: Unintentional poisoning caused by chemicals that are not medicines.

Acute exposure: A single exposure to a toxic substance which results in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day, as compared to longer, continuing chronic exposure over a period of time.

Agricultural pollution: Farming wastes, including runoff and leaching of pesticides and fertilizers; erosion and dust from plowing; improper disposal of animal manure and carcasses; crop residues, and debris.

Air particulates: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Chemical composition of particulates varies widely, depending on location and time of year. Airborne particulates include windblown dust, emissions from industrial processes, smoke from the burning of wood and coal, and motor vehicle or non-road engine exhausts.

Air pollutant: Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into two main groups: (1) those emitted directly from identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation.

Air quality standards: The level of pollutants prescribed by regulations that may not be exceeded during a given time in a defined area.

Ambient air: Any unconfined portion of the atmosphere: open air, surrounding air. Ambient air is usually outdoor air (as opposed to indoor air).

Arsenic: A metal widely distributed in nature and found mostly in water. Industrial contamination is the primary source of airborne arsenic. Active smelters may be a source of high exposure to arsenic fumes and dust. The manufacture of pesticides and other agricultural products are the major source of occupational exposure. Arsenic has been associated with skin cancer, lung cancer, peripheral vascular disease, and liver injury. Reproductive effects have been noted in animals.

Asbestos: A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. EPA has banned or severely restricted its use in manufacturing and construction. **Brownfields:** Abandoned, idle, or underused industrial or commercial sites that raise concern in nearby communities that any expansion or redevelopment could contaminate the environment.

Carbon monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Carcinogen: Any substance that can cause or aggravate cancer.

Chronic effect: An adverse effect on a human or animal in which symptoms recur frequently or develop slowly over a long period of time.

Chronic toxicity: The capacity of a substance to cause long-term poisonous human health effects.

Community water system: A public water system that provides water to at least 15 service connections used by year-round residents or that regularly serves at least 25 year-round residents.

Endocrine disruptors: Synthetic chemicals and natural plant compounds that may affect the endocrine system (the communication system of glands, hormones, and cellular receptors that control the body's internal functions). Many of these substances have been associated with developmental, reproductive, and other health problems in wildlife and laboratory animals. Some experts suggest these compounds may affect humans in similar ways.

Environmental epidemiology: The study of the effect on human health of physical, biological, and chemical factors in the external environment. Can include examining specific populations or communities exposed to different ambient environments to clarify the relationship between physical, biological, or chemical factors and human health.

Environmental hazards: Situations or conditions in which something in the environment, such as radiation, a chemical, or other pollutant, can cause human illness or injury.

Environmental tobacco smoke: Smoke given off by cigarettes, pipes, or cigars to which nonsmokers can be exposed.

Environmental toxicology: Scientific analysis of the relationship between exposure to hazardous substances found in the environment and adverse health effects in people.

Fungicide: Pesticides which are used to control, deter, or destroy fungi.

Good indoor air quality practices: Operation and maintenance procedures designed to provide air quality inside a building to increase comfort and productivity and to reduce health risks for people in the building.

Greenhouse gas (GHG): A gas that absorbs radiation of specific wave lengths within the infrared spectrum of radiation released by the earth's surface and clouds so that part of the absorbed energy is trapped and the earth's surface warms up. Water vapor, carbon dioxide, nitrous oxide, methane, and ozone are the primary greenhouse gases in the earth's atmosphere.

Hazard Ranking System (HRS): The principal screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or ground water and on other factors, such as density and proximity of human population. This score is the primary factor in deciding whether the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hazardous substances: Any substance that possesses properties that can cause harm to human health and ecologic systems. A subset of these substances, toxics, or toxicants is substances not produced by a living organism that can cause harm to human health and ecologic systems.

HazDat: A scientific database maintained by the Agency for Toxic Substances and Disease Registry. Provides access to information on the release of hazardous substances from Superfund sites or from emergency events and on the effects of hazardous substances on health.

HEPA filter: High-Efficiency Particulate Air filter. A filter that can remove particles of 0.3 micrometers or larger from the air at 99.97 percent or greater efficiency.

Household lead dust: Very fine particles containing lead that are usually caused by the deterioration of lead paint.

Indoor air quality (IAQ): The overall state of the air inside a building as reflected by the presence of pollutants, such as dust, fungi, animal dander, volatile organic compounds, carbon monoxide, and lead.

Indoor allergens: Fine particles in indoor air that can cause allergic reactions and respiratory problems, including dust mites and animal dander.

Infectious agents: Any organism, such as a virus, parasite, or bacteria, that is capable of invading the body, multiplying, and causing disease.

Insecticide: A pesticide compound specifically used to kill or prevent the growth of insects.

Integrated Pest Management (IPM): A mixture of chemical and other, non-pesticide, methods used to control pests.

Lead (Pb): A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations.

Mercury: A heavy metal that can accumulate in the environment and is highly toxic if breathed or swallowed.

Municipal solid waste: Common garbage or trash generated by industries, businesses, institutions, and homes.

National Ambient Air Quality Standards (NAAQS): Standards set by EPA for the level of common air pollutants allowed by the Clean Air Act.

National Exposure Registry: A listing of persons exposed to hazardous substances. This listing is composed of chemical-specific subregistries. The primary purpose of the registry program is to create a large database of similarly exposed persons. This database is to be used to facilitate epidemiology research in ascertaining adverse health effects of persons exposed to low levels of chemicals over a long period.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term cleanup under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA updates the NPL at least yearly. A site must be on the NPL to receive funds from the Superfund Trust Fund for remedial action.

Neurotoxins: A biological or chemical substance or agent that has an adverse effect on the structure or function of the central and/or peripheral nervous system.

Nitric Oxide (NO): A gas formed by combustion under high temperature and high pressure in an internal combustion engine; changes into nitrogen dioxide in the ambient air and contributes to photochemical smog.

Nonattainment area: A locality where air pollution levels persistently exceed EPA's National Ambient Air Quality Standards.

Nonpoint source: The source of runoff water coming from an area such as a yard, parking lot, pasture, or other urban or agricultural area.

Ozone: Ozone occurs naturally in the stratosphere and provides a protective layer high above the earth. At ground-level, however, ambient ozone is the prime ingredient of smog. Ambient ozone refers to ozone in the troposphere—the air that people breathe—which is different from ozone in the stratosphere, the hole in the ozone layer. Ozone is not emitted directly into the air but is formed readily in the atmosphere, usually during hot summer weather, from volatile organic compounds emitted by motor vehicles, chemical plants, refineries, factories, consumer and commercial products, other industrial sources, trees, and from nitrogen oxides emitted by motor vehicles, power plants, and other sources of combustion. Changing weather patterns contribute to yearly differences in ozone concentrations from city to city.

Particulate matter: General term used for a mixture of solid particles and liquid

droplets found in the air. These particles, which come in a wide range of sizes, originate from “built” and natural sources. Fine particles (PM2.5) result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves. Coarse particles (PM10) generally are emitted from other sources, such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust.

Parts per billion (ppb)/parts per million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Persistent chemicals: Chemicals, such as organochlorine compounds, that remain in the environment for a long time and can accumulate in the fat of people and animals exposed to them.

Pest: An insect, rodent, nematode, fungus, weed, or other form of terrestrial or aquatic plant or animal life that is injurious to health or the environment.

Pesticide: Substances or mixture thereof intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant.

Picocuries per liter (pCi/L): A unit of measure for levels of radon gas.

Point source: The source of water coming from a specific location, such as a drainpipe from a wastewater treatment plant or an industrial plant.

Poisoning: An exposure to a toxic substance that produces negative signs or symptoms.

Polychlorinated biphenyls (PCBs): A series of isomers and compounds used mainly as plasticizers, flame retardants, and insulating materials. PCBs are potentially toxic and carcinogenic. Toxic effects generally involve damage to the skin and liver. PCBs have been found to cause reproductive problems in humans and cancer in laboratory animals. Further sale and new use of PCBs in the US was banned in 1979.

Radon: A colorless, naturally occurring radioactive gas found in some soils or rocks.

Radon-resistant construction: Affordable and simple techniques that, when incorporated during construction of a new home, reduce indoor radon levels by preventing radon entry and providing a means for venting radon to the outdoors.

Registry of Toxic Effects of Chemical Substances (RTECS®): Maintained by the National Institute for Occupational Safety and Health, this database contains information on the toxic effects of chemical substances. The list of substances includes drugs, food additives, preservatives, ores, pesticides, dyes, detergents, lubricants, soaps, plastics, extracts from plant and animal sources, plants or

animals that are toxic by contact or consumption, and industrial intermediates and waste products from production processes.

Smog: Air pollution associated with oxidants.

Substandard housing: Housing with moderate or severe physical problems in plumbing, heating, or electrical systems, upkeep, and sanitation, hallways, or kitchens.

Superfund: The program operated under the legislative authority of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA) that funds and carries out EPA solid waste emergency and long-term removal or remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting or supervising cleanup and other remedial actions or both.

Sustainable development: Growth and development within a society that is intended to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Toxic Release Inventory (TRI): EPA's list of more that 600 designated chemicals that threaten health and the environment. Authorized under the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986, this system requires manufacturers to report releases of these chemicals to EPA and State governments. EPA compiles the data in an online, publicly accessible national computerized database.

TOXLINE: A collection of online information on drugs and other chemicals maintained by the National Library of Medicine.

µg/dL: Micrograms per deciliter.

Urban sprawl: Unplanned and inefficient development of open land.

Vector-borne diseases: Illnesses that are transmitted to people by organisms, such as insects.

Vector control: Control of any object, organism, or thing that transmits disease from one host to another.

Adapted with permission from:

Children's Environmental Health Network. [online] 1997 [cited 2002 Aug 20]. Available from: URL: http://www.cehn.org/cehn/resourceguide/glossary.html

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Supplementary Materials

on Environmental Topics of Special Interest to Child Care Providers

Art Materials: Key Points and Preventive Actions

Key Points

Art activities are a key component of any child care program, allowing children to express themselves creatively.

Some art materials contain chemicals such as metals (e.g., lead), solvents (e.g., turpentine), and dusts or fibers (e.g., asbestos) that are hazardous if inhaled, absorbed, or swallowed. For example, lead can be found in artist's paints since legal bans on lead and other metals do not apply. Lead and other toxic metals can also be found in pastels, pigments, inks, glazes, enamels, and solder (AAP, 1999).

Much of risks from art materials can be eliminated by carefully selecting materials that are safe for use by children. The product label provides key information.

When products are labeled nontoxic it means that the product has passed the short-term toxicity test required by the Federal Hazardous Substance Act (FHSA) but does not mean it passes the long- term toxicity test.

The Labeling of Hazardous Art Materials Act (LHAMA) supplements the FHSA requiring manufacturers of hazardous art materials to 1. determine the potential for chronic long-term health hazards and 2. place appropriate warning labels on those products found to pose such chronic long-term effects.

Arts and crafts materials imported or sold in the United States are required by the LHAMA to meet the ASTM (American Society of Testing Materials) D-4236 regulations for chronic long-term health hazards. It is illegal to sell an art product in the US that does not have this statement on its label. It is important to note that this statement does not mean the product is safe, rather it has been certified by a toxicologist that the label information provides adequate information for safe use (Arts, Crafts, and Theatre Safety [ACTS], 2000).

Product seals are not required by law. These seals identify a company or group such as the Arts and Creative Materials Institute (ACMI) whose toxicologist certified the product (ACTS, 2000). The ACMI seals are the AP (approved product – nontoxic even if ingested), CP (certified product – are nontoxic even if ingested and meet or exceed quality standards of material, workmanship, working qualities, and color), and Health Label (no health labeling required) [AAP, 1999].

Preventive actions

Choose products that have the following on the label:

Nontoxic.

Conforms to ASTM D-4236 statement.

Clearly marketed for children.

No hazards or precautionary statements.

Certified or approved product seals indicate the company ACMI has tested the product and it contains no materials in sufficient quantities to be toxic or injurious even if ingested.

Obtain and read the Material Safety Data Sheet (MSDS) for the product and check for toxic ingredients. If in doubt, contact the manufacturer, toxicologist, or a poison control center for more information.

Always follow the directions and precautions on the packaging label carefully.

Choose materials designed not to create dusts, sprays, vapors, or fumes which can be inhaled, or which result in excessive skin contact. For example:

It may be safer to buy supplies in premixed or liquid formulations instead of powder forms to reduce exposure to dusts.

Use water-based products instead of oil-based, keeping in mind to read the label and look for materials identified as safe for children.

Equip craft areas appropriately:

Use work surfaces that are hard and smooth for easy and thorough cleaning

Ventilate

Store materials safely

Protect against exposure (e.g., wear aprons, don't allow food and drink in the art area and have children wash their hands after doing arts and crafts

Use age-appropriate products (e.g. don't let children use adult art materials that contain toxic chemicals)

Supervise children closely. For example, some children are attracted to fruit-scented markers and may try to eat them.

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Arts, Crafts and Theatre Safety, Inc. Selecting children's art materials. New York (NY): Arts, Crafts and Theatre Safety, Inc.; 2000.

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Cleaning Products: Key Points and Preventive Actions

Key Points

Many common cleaning products and household products contain volatile organic compounds (VOCs), organic solvents that easily evaporate into the air. Furniture cleaners and polishes, floor cleaners and polishes, oven cleaners, household cleansers, carpet shampoos and disinfectants are a few examples.

Short-term effects include eye, nose and throat irritation, and headaches. Long-term exposure can cause loss of coordination; nausea, and damage to liver, kidneys and the central nervous system. Some organics can cause cancer in animals and are suspected of causing cancer in humans.

Preventive Actions

First, read the labels of products you are considering buying. Buy the least harmful product available. Choose products labeled “warning” or “caution” since these are less harmful than those labeled “poison” or “danger.”

Always use household products only for their intended purpose and according to the manufacturer's instructions.

Use the product in a well-ventilated area.

Choose products that are packaged to reduce the chance of spills, leaks and child tampering.

Keep household products in their original containers so that safety information and directions for use are always with the product.

Avoid excessive use.

Don’t mix up “extra-strength” batches, dilute according to the manufacturer’s directions.

Make sure products are safely stored where children cannot get them.

Reduce the need for these products by:

Quickly attend to spills and stains and remove food wastes promptly.

Using alternative (use ingredients such as vegetable-based liquid soap, baking soda, and vinegar**)** or less toxic products. Remember while alternative or less toxic products are safer, they are not all non-toxic. Use the same precautions as with other cleaners such as store out of the reach of children. An important consideration when making your own cleaners is to store them in unused, store-bought containers (never put them in old food containers) and label them carefully.

Using a multi-purpose cleaner so that you do not need to have a different product to clean each surface in your house. Chose a cleaner without antimicrobial agents. By keeping sanitizers & disinfectants out of cleaners reduces their toxicity as well as reduces the amount of disinfectant chemical used (City of Santa Monica, CA, 1998).

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Noise: Key Points and Preventive Actions

Key Points

"As with all the senses, human beings are designed to detect changes in sound but not to endure a steady onslaught of it…Unlike adults, children have a few habituated responses for lessening the impact of noise and virtually no control over what they hear" (Olds, 2001 p. 180-181).

Sound is also an important source of orientation and security, especially for children. Many find the sounds of other children crying, of unfamiliar equipment, and even experience extreme quiet as anxiety-provoking. On the other hand, familiar sounds – human voices, soft music, birds, and breezes outside – are comforting and reassuring, especially in a strange place" (Olds, 2001 p. 180-181)

Although few studies have been done to estimate children's exposure to noise, noise affects hearing and can result in physiologic effects such as sleep deprivation and undesirable cardiovascular effects and psychological effects such annoyance, interference with activity and symptoms such as headaches, tiredness, and irritability (AAP, 1999).

It is likely that children are routinely exposed to more than the 24-hour equivalent noise exposure of 70dBA recommended as an upper limit by the US EPA in 1974. Examples of sounds at 70dBA include vacuum cleaner, freeway traffic at 15 meters, noisy office or party, TV audio (AAP, 1999).

Preventive actions

Reduce a room's "echoing" qualities by adding absorbent surfaces and by varying ceiling and furniture heights.

Reduce sources of loud noises (e.g., toys that make loud noises; lower the volume on computers and radio/tape/CD player when in use; use headphones with caution – set the volume level so that normal conversation can still be heard.)

Separate quiet and noisy areas when designing play areas,

Block noise from the outside with techniques similar to conserving energy indoors: double windows, weather stripping on doors and windows, and sealing air leaks. Dampen the sound around the building with landscaping such as a dense barrier of trees and shrubs.

Introduce a pleasing background sound to help offset noise and make the direct sounds from children and activities less noticeable.

Introduce acoustic pleasure (e.g., hang wind chimes inside as well as outside an open window.

(Adapted from Olds [2001] and AAP [1999].)

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Sun Safety: Key Points and Preventive Actions

Key Points

While some exposure to sunlight can be enjoyable, too much can be dangerous. Overexposure to ultraviolet (UV) radiation in sunlight can result in a painful sunburn. It can also lead to more serious health effects, including skin cancer, premature aging of the skin, and other skin disorders; cataracts and other eye damage; and immune system suppression.

Children are particularly at risk of overexposure, since most of the average person's lifetime exposure occurs before the age of 18.

Currently, one in five Americans develops skin cancer during their lifetime. The incidence of melanoma, the most serious type of skin cancer, is increasing faster than almost every other form of cancer.

Due to the depletion of the ozone layer, increased levels of harmful UV radiation are likely to reach the Earth.

Many believe that only lighter-skinned people need to be concerned about the effects of overexposure to the sun. Though it is true that darker skin has more natural pigment, which acts as a protectant, the skin is still susceptible to many of the damaging effects of UV radiation. The incidence of skin cancer is lower in dark-skinned people, but it still occurs and is often not detected until later stages when it is more dangerous.

The risk of other UV-related health effects, such as cataracts, premature aging of the skin, and immune suppression, is not dependent upon skin type (EPA, 2002i).

Preventive actions

The best sun protection is provided when all the sun-safe behaviors are practiced together. Sun protection habits include:

Limit Time in the Midday Sun. The sun's rays are strongest between 10 a.m. and 4 p.m. Whenever possible, limit exposure to the sun during these hours.

Seek Shade . Staying under cover is one of the best ways to protect your-self from the sun. Remember the shadow rule: Watch Your Shadow. No Shadow, Seek Shade! (American Academy of Dermatology, 1999).

Always Use Sunscreen. Apply a broad spectrum (blocks UVA and UVB) sunscreen of an Sun Protection Factor (SPF) of at least 15 or higher liberally on exposed skin and reapply every 2 hours when working or playing outdoors. Even waterproof sunscreen can come off when you towel off, sweat, or spend extended periods of time in the water. Sunscreen should be applied 30

minutes before exposure to the sun and reapplied every 2 hours. “The issue of whether sunscreen is safe for infants under the age of 6 months is controversial”(AAP, 1999 p. 244). Of primary importance in this age group is to avoid high-risk exposure and use adequate protection through the use of clothing, hats and shade should be used. Remember, best practice indicates that the child care program has a written policy for the use of any commonly used nonprescription medication for oral or topical use and that it includes parental consent. Sunscreen should be included in this policy.[8.021]

Wear a Hat. A hat with a wide brim offers good sun protection to your eyes, ears, face, and the back of your neck - areas particularly prone to overexposure to the sun.

Cover Up. Wearing tightly woven, loose-fitting, and full-length clothing is a good way to protect your skin from the sun's UV rays.

Wear Sunglasses that Block 99-100% of UV Radiation. Sunglasses that provide 99-100% UVA and UVB protection will greatly reduce sun exposure that can lead to cataracts and other eye damage. Check the label when buying sunglasses.

Watch for the UV Index. The UV Index provides important information to help you plan your outdoor activities in ways that prevent overexposure to the sun. Developed by the National Weather Service and EPA, the UV Index is issued daily in selected cities across the United States.

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Environmental Health Center of the National Safety Council. Sun safety: sun safety links. [online] 2001 [cited 2002 Aug 19]. Available from: URL: http://www.nsc.org/ehc/sunwise/sunlinks.htm

Weather Watch: Key Points and Preventive Actions

Key Points

Heat and cold-related injuries are serious problems for children resulting in death, heatstroke, heat exhaustion, frostbite and hypothermia.

"Watching the weather is just a part of the job for child care providers" writes Healthy Child Care Iowa in their Child Care Weather Watch Factsheet (Healthy Child Care Iowa, 2002).

Understanding the weather forecast means understanding weather terminology such as wind-chill (how cold it feels when air temperature and wind are combined) and heat index (how hot it feels when air temperature and relative humidity combined). For example, a wind-chill factor of 16° (30° F and a wind speed of 10 mph) is cold and a heat index of 95° (90°F and a relative humidity of 45) is uncomfortable.

Preventive actions

Play outdoors when it is safe and comfortable for the children. Use a wind-chill factor and heat index chart as a guide (e.g., see Child Care Weather Watch.)

Provide cooling off activities when temperatures are high, such as running through a sprinkler. Provide an air-conditioned environment when the heat index, both humidity and temperature, is high.

K**eep children hydrated**, especially in high temperatures and when they are physically active. Water and fruit juices are best.

Monitor length of time outside based on child's age and weather conditions.

Dress children to maintain a comfortable body temperature.

In warm weather, this should be lightweight cotton protective clothing, including hats.

In cold weather, this should be loose fitting, lightweight, warm clothing in several layers. The trapped air between the layers serves to insulate. Layers can be removed to avoid perspiration and subsequent chill. Outer garments should be tightly woven, water repellent, and hooded if possible. Since half of all body heat is lost through the top of the head, hats are necessary. Mittens, snug at the wrists are better than gloves. It is important to make sure the children stay dry (Schneider and Freeman, 2000).

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Environmental Concepts

Directions: Unscramble each of the clue words. (see next page for descriptions of the clue words.) Then copy the letters in the numbered cells to other cells with the same number.

VNMEONINRET

RANATUL

MAUHN-DEAM

SICLAO

NOIMECCO

TEECOYMSS

SITBULIASYTANI

1	2	3	4	5	6	7	8	9	10	11	12	13

14	15	16	17	18	14

Puzzle created with tools from:
Network Solution Developers, Inc. [online] 2002 [cited 2002 Aug 19]. Available from: URL:

Word Puzzle Clues

VNMEONINRET All of the circumstances, objects and conditions around us

RANATUL Features of the environment such as the soil, water, air, wildlife, seasons and the weather

MAUHN-DEAM Features of the environment such as housing, work, school, & child care environments, transportation, industry, and agriculture

SICLAO Features of the environment such as family structure, social networks, child care, educational and health care systems

NOIMECCO Features of the environment such as resources, employment, and liveable wages

TEECOYMSS While our environment is the space around us, this describes the relationship among organisms and their environment

SITBULIASYTANI A way of life that safeguards and enhances our resources, prevents harm to the natural environment and human health, and sustains and benefits the community and local economy – for the sake of current and future generations

ANSWER Comprises those aspects of human health, disease, and injury that are determined or influenced by factors in the environment. This includes the study of both the direct pathological effects of various chemicals, physical, and biological agents, as well as the effects on health of the broad physical and social environment

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Indoor Air Quality Tools for Schools' Walkthrough Inspection Checklist (EPA, 2002d)

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Help Yourself to a Healthy Home. (USDA Home*A*Syst and Farm*A*Syst national program, 2001)

How Asthma-Friendly is Your Child Care Setting? Checklist