Environmental Health

First Edition, 2006

California Childcare Health Program
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www.ucsfchildcarehealth.org

Funded by First 5 California with additional support from the California Department of Education Child Development Division and Federal Maternal and Child Health Bureau.

This module is part of the California Training Institute's curriculum for Child Care Health Consultants.

Acknowledgements

The California Childcare Health Program is administered by the University of California, San Francisco School of Nursing, Department of Family Health Care Nursing.

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We also want to thank the staff and Advisory Committee members of the California Childcare Health Program for their support and contributions.

California Childcare Health Program

The mission of the California Childcare Health Program is to improve the quality of child care by initiating and strengthening linkages between the health, safety and child care communities and the families they serve.

Portions of this curriculum were adapted from the training modules of the National Training Institute for Child Care Health Consultants, North Carolina Department of Maternal and Child Health, The University of North Carolina at Chapel Hill; 2004-2005.

Funded by First 5 California with additional support from the California Department of Education Child Development Division and Federal Maternal and Child Health Bureau.

LEARNING OBJECTIVES

To describe the major environmental health issues affecting young children and providers in early care and education (ECE) programs.

To identify contributing factors impacting children's unique vulnerability to environmental hazards.

To use an environmental health assessment tool in an ECE program.

To describe preventive actions to reduce environmental health risks.

To describe three ways a Child Care Health Consultant (CCHC) can assist ECE programs with meeting their environmental health needs.

To identify the primary environmental health resources available to assist and support ECE providers and families.

WHY IS ENVIRONMENTAL HEALTH IMPORTANT?

Scientists, policymakers, and the public have raised concerns about children's exposure to environmental contaminants such as lead, mercury, and synthetic chemicals like pesticides (Crain, 2000; Monks, 1997). There are also significant concerns about possible links between environmental exposures to common chemicals and asthma, cancer, autism, and other diseases that affect children (Greater Boston Physicians for Social Responsibility [GBPSR], 2000). What is most problematic is that while low levels of exposure to many chemicals are unavoidable, scientists know little about the risks of such exposures. Added to this is the problem that scientists are frequently unable to distinguish which chemicals might be dangerous because people are exposed to so many simultaneously. Moreover, chemicals in the environment may act synergistically, meaning that their combined effect is greater than the sum of the effects of the individual chemicals.

WHAT THE CCHC NEEDS TO KNOW

It is important for the CCHC to have an understanding of the historical gains made in public 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 percent of infants died before their first birthday. In some U.S. cities, this percentage rose as high as 30 percent. By the end of the last century, the rate of infant mortality had declined to less than 1 percent (Centers for Disease Control and Prevention [CDC], 1999). Clearly, during this period, public health made astonishing strides in reducing health risks for American children.

> Huge strides in public health and medicine made during the last century have resulted in a dramatic increase in life expectancy, a significant decrease in infant mortality, and a proliferation of products to improve our lives. We are living longer, healthier, and safer lives than our predecessors (Thompson, 2000).

Yet while some risks declined dramatically over the last century, new risks emerged:

- More than three million children under five die each year from environment-related causes and conditions (World Health Organization, 2005).
- Asthma rates for children have doubled in the last 15 years (Crain, 2000). In the United States in 2001, 8.7% (6.3 million) of all children had asthma (Environmental Protection Agency [EPA], 2005). According to the *Strategic Plan for Asthma in California* (2002), the rates in California are similar to the national rates. More information on asthma can be found in the *Asthma Information Packet* (CCHP, 2005) (http://www.ucsfchildcarehealth).
- Childhood cancer rates have increased 10 percent between 1973 and 1991 (Mott, Fore, Curtis and Solomon, 1997). Since 1999, the National Cancer Institute reported that this increase in childhood cancers leveled off after 1990 (Ries et al., 1999).
- Rates of infants born with low birth weight have risen steadily since the 1980s despite prevention efforts (Pew Environmental Health Commission, 1999). In 2004, in California, 6.6% of newborns were low birth weight. The rate has remained approximately the same from 1997 to 2004 (Perinatal Outcomes Project, 2004).
- 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 (Pew Environmental Health Commission, 1999). Heart defects are the most common birth defect in California, with 1.8 cases per 1,000 live births from 1997 to 1999. The rates of birth defects in California generally remained constant during the 1990s (EPA, 2005).
- Rates of hyperactivity, learning disabilities, slowness to learn, autism, and disruptive behavior among school-age children have increased significantly over the last two decades (GBPSR, 2000).

Increasing evidence suggests that environmental factors, such as exposure to toxic substances and pollution, may play an influential role in the emergence of these new risks (Bearer, 1995; Crain, 2000; GBPSR, 2000; Mott et al., 1997). Since World War II, thousands of new chemicals have been introduced into the environment, yet only a fraction have received thorough testing for harm to human health, much less for toxicity to the child's developing brain.

Nearly 75 percent of the top high production and volume chemicals have undergone little or no toxicity testing. However, the EPA estimates that up to 28 percent of all chemicals in the current inventory of about 80,000 have neurotoxic potential. 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 (GBPSR, 2000, p. 6).

With respect to preventing environmental risks in ECE programs, Fiene (2002) 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 (p. 93).

Children's Unique Vulnerability to Environmental Hazards

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 through skin exposure. For example, children ingest the residue of pesticides, mercury, or other toxic agents in their food 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, young children's developmental stage and behaviors increase their exposure to environmental toxins in the following ways:

More Contact with the Ground

Infants and young children spend a large portion of their time closer to the ground than adults. 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. Bearer (1995) points out that young children are also at greater risk than adults because their breathing zones (the places in space where individuals breathe) are closer to the ground. Adult breathing zones are typically four to six feet from the ground. For children, however, the breathing zone is often within the one to two foot range. "It is within these lower breathing zones that heavier chemicals such as mercury…settle out and radon accumulates" (Bearer, 1995, p. 15).

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, and the time spent is more likely to be active, which requires deeper breathing. Children also breathe frequently through their mouths, bypassing nasal filtering. All of these characteristics make children more susceptible than adults to air pollutants.

More Hand-to-Mouth Activity

Young children explore the world orally 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.

Less Varied Diet

A child's diet is less varied than that of an adult. For example, the diet of infants is generally limited to breast milk or formula. The average 1-year-old drinks 21 times more apple juice, 11 times more grape juice, and nearly five times more orange juice per unit of body weight than the average adult. Infants and children also drink two-and-a-half times more water daily than adults as a percentage of their body weights (Mott et al., 1997). If these foods contain contaminants, children will have greater exposure than adults because the foods constitute a larger proportion of their diet.

Children's Biological Immaturity Increases their Exposure to Environmental Toxins

Because children are physically smaller than adults, their metabolic rate is higher. As a result, they breathe more rapidly and take in proportionally more oxygen. They also consume more food and water relative to their size than adults. This means that their relative dose of any pollutants available in air, food, or water would be greater than that for adults. Children's rate of absorption of substances they consume or breathe is also higher than that of adults. Often this is advantageous. For example, children need more calcium than adults to support bone growth, and they also absorb more calcium than adults do from the same food sources. However, as Bearer (1995) points out, this enhanced absorption can also significantly increase their intake of contaminants.

Lead, because it is absorbed in place of calcium when it is present, is absorbed to a greater extent in children than in adults. An adult will absorb 10 percent of ingested lead, whereas a 1- to 2-year-old child will absorb 50 percent of ingested lead (Bearer, 1995).

Because their metabolic systems are still developing, children are less capable of counteracting toxic effects than adults. For example, infants are unable to excrete toxins or store them away in fatty tissues as well as adults, which may increase their length of exposure to toxins. Also, in adults the blood-brain barrier protects the brain from potentially toxic chemicals circulating through the body. In infants, this barrier is not fully developed until 6 months of age. Finally, children's respiratory passages are narrower than adults, meaning that irritation caused by air pollution can result in more airway obstructions.

Children's exposure to environmental hazards during sensitive periods of rapid organ development may permanently alter the structure or function of that organ.

Table 1:
Environmental Risk Factors for Children at Different Stages of Development

Developmental Stage	Developmental Characteristics	Exposure Pathways	Biological Vulnerabilities
Newborn (0 to 2 months)	Nonambulatory Restricted environment High calorie/water intake High air intake Highly permeable skin Alkaline gastric secretions (low gastric acidity)	Food Breast milk Infant formula Indoor air Tap/well water	Brain Cell migration Neuron myelination Creation of neuron synapses Lungs Developing alveoli Bones Rapid growth and hardening
Infant/Toddler (2 months to 2 years)	Beginning to walk Oral exploration Restricted environment Increased time away from parents Minimal variation in diet Increased outdoor time	Food Baby food Milk/milk products Air Indoor Layering effects Tap/well water in home and child care facility Surfaces Rugs Floors Lawns	Brain Creation of synapses Lungs Developing alveoli
Preschool Child (2 to 6 years)	Language acquisition Group & individual play Growing independence Increased intake of fruits and vegetables Active outdoor play	Food Fruits, vegetables Milk/milk products Air ECE programs Outdoor Water Tap/well Water fountains	Brain Dendritic trimming Lungs Developing alveoli Increasing lung volume

Adapted from Bearer (1995).

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 (GPBSR, 2000). Bearer (1995) summarizes the environmental risk factors for children at different stages of development in Table 1.

The Most Significant Environmental Health Hazards for Children

Children are exposed to environmental contaminants on a daily basis at home, indoors, outdoors, and in ECE programs. Some risks, such as exposure to tobacco smoke, are well documented, whereas others, such as long-term, low-level exposures to many chemicals simultaneously, are more complex and difficult to demonstrate, and therefore relatively untested.

> Even when regulated, the risks from chemical exposure are estimated for one chemical at a time, while children are exposed to many toxicants in complex mixtures throughout development. Multiple chemical exposures often interact to magnify damaging effects or cause new types of harm (GBPSR, 2000, p. 6).

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 preschool age children are: **environmental tobacco smoke, lead, air pollution, pesticides, and drinking water contamination** (Crain, 2000; Gratz & Boulton, 1993). This module addresses lead, air pollution, pesticides, and water pollution. For each of these risks, this module will address:

- the source(s) of the pollutant in ECE programs
- health effects of exposure for young children
- detection of the pollutants in ECE programs
- recommended actions for prevention and management

Environmental Tobacco Smoke

Children who are exposed to environmental tobacco smoke, also known as secondhand smoke, are at increased risk for a number of adverse health effects, including lower respiratory tract infections, bronchitis, pneumonia, fluid in the middle ear, asthma symptoms and Sudden Infant Death Syndrome (SIDS). Exposure to environmental tobacco smoke also may be a risk factor contributing to the development of new cases of asthma. Young children appear to be more susceptible to the effects of environmental tobacco smoke than older children are. In the United States, the percentage of homes with children under 7 in which someone smokes on a regular basis decreased from 29% in 1994 to 19% in 1999 (EPA, 2005).

Since it is required by Community Care Licensing (State of California, Health and Human Services, Department of Social Services, 2002) and *Caring for Our Children: National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs, Second Edition* (CFOC) (American Academy of Pediatrics [AAP], American Public Health Association, & National Resource Center for Health and Safety in Child Care, 2002) that there be no smoking in ECE programs, environmental tobacco smoke will not be addressed in this module. See *Handout: No smoking poster.* The National Standards state the following:

> **Standard 3.041 Tobacco Use and Prohibited Substances:** Tobacco use, alcohol, and illegal drugs shall be prohibited on the premises of the facility at all times.
>
> **Rationale:** Scientific evidence has linked respiratory health risks to secondhand smoke. No children, especially those with respiratory problems, should be exposed to additional risk from the air they breathe. Infants and young children exposed to secondhand smoke are at risk of developing bronchitis, pneumonia, and middle ear infections when they experience common respiratory infections. Separation of smokers and nonsmokers within the same air space does not eliminate or minimize exposure of nonsmokers to secondhand smoke.

Lead

Lead is a highly toxic metal found in common everyday items such as paint and lead-tainted soil. Because it does not break down, lead persists in the environment. Research in the 1970s and 1980s demonstrated that seemingly healthy children with elevated levels of lead had lower IQ scores and more language difficulties, attention problems and behavior disorders than children with normal levels (National Research Council, 1993). 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 (Schneider & Freeman, 2000; AAP, 2003). 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. Leaded gasoline from pre-1970s is still largely responsible for the high concentration of lead in the soil near busy roads and highways.

Sources of Lead in ECE Programs

ECE facilities housed in buildings built before 1978, and especially those constructed before 1950, present relatively high risks for exposure for children. The U.S. Department of Housing and Urban Development [HUD] (1995) estimates that 75 percent 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 percent lead. *Lead paint is still the most important lead hazard for children* (AAP, 2003). Lead 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 paint is well-maintained and surfaces are kept clean. In fact, disturbance of lead-based paint during remodeling and renovation of older homes can pose high risks for lead exposure (HUD, 1999).

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 (Michael, 2002). 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 (Schneider & Freeman, 2000). See *Handout: Health and Safety Note: Lead in Keys* and *Handout: Health and Safety Note: Anemia, Lead Poisoning, and Child Care*.

Secondary Sources of Lead

Some relevant secondary sources of lead that may add to exposure levels in ECE programs include (Schneider & Freeman, 2000; AAP, 2003):

- drinking water contaminated by lead-soldered pipes in the facility plumbing
- older and imported toys (especially those from developing countries)
- arts and crafts materials
- old pottery, imported pottery, or pewter
- imported vinyl mini-blinds
- older outdoor playground equipment coated with lead-based paint
- air-borne lead from nearby industries that produce lead-containing materials

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 (AAP, 2003). Low levels of lead are associated with lower IQ scores, impaired neurobehavioral development, decreased stature and growth, and impaired hearing acuity (CDC, 2002a). Lead effects are permanent and continue to affect a child's functioning throughout life. Except at extreme levels, lead poisoning usually *shows no obvious symptoms*. It can only be confirmed through direct blood testing (AAP, 2003; AAP et al., 2002). For this reason, the AAP (2003) 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

Detection of Lead Problems in ECE Programs

Accurate detection of lead exposure risks *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 (Rossiter, Vangel, McKnight & DeWalt, 2000). To locate a certified professional for lead testing, contact your state or local health department. This site lists lead evaluation service providers and lead hazard control service providers by state.

Actions for Prevention and Management of Lead Exposure in ECE Programs

The risk of lead exposure in ECE programs cannot be entirely eliminated, but it can be significantly reduced. The following list summarizes actions recommended to manage and prevent lead exposures. The recommendations are derived from AAP et al. (2002), CDC (2002), AAP (2003), National Center for Healthy Housing (2001), and HUD (1995, 1999).

- **Test soil.** If the facility was built before 1978, the paint likely contains lead. Have the facility and surrounding soil tested for lead by a certified professional.
- **Remove or encapsulate paint.** The National Standards (AAP et al., 2002) state that paint containing lead levels of 0.06% and above on any surfaces that are accessible to children should be removed, or the surfaces should be made otherwise inaccessible to children, regardless of the condition of the surface. If the paint cannot be removed entirely, it can be encapsulated by painting over it with paints specifically made to cover lead-based paints. Lead paint may be enclosed by covering it with a nonleaded surface, e.g., vinyl siding. Enclosure does not remove the lead hazard, but generates very little lead dust. These procedures should be carried out by a certified professional.
- **Replace window treatments.** Replace any old vinyl mini blinds that may contain lead with new ones that do not contain lead, or use alternative window treatments.
- **Keep the ECE program clean.** Even if lead paint or other lead sources are not present in the facility, dust and dirt containing lead can be easily tracked in from the outside. Install a good doormat and keep it clean.
- **Wash hands.** Frequent washing of children's hands, especially before eating and naptime, and after playing outdoors; and washing toys that are mouthed will reduce ingestion of lead.

Air Pollution

Air pollution affects children more than adults because of their narrower airways, more rapid rate of respiration, and the fact that they inhale more pollutants per pound of body weight (AAP, 2003). See Table 2 for sources of indoor and outdoor air pollution in ECE programs (National Training Institute for Child Care Health Consultants, 2004).

California has taken important steps to protect children from environmental pollutants with unprecedented funding to support cleanups of hazardous substances at school sites, to evaluate air quality in portable classrooms and to ensure that environmental standards safeguard infants, children and other sensitive people. The California Environmental Protection Agency (Cal/EPA) and its boards, departments and office are implementing these programs under several laws, including the Children's Environmental Health Protection Act of 1999 and the Governor's Children's Environmental Health Initiative. Together

Table 2:
Sources of Indoor and Outdoor Air Pollution in ECE Programs

Pollutant	Description	Sources
Environmental Tobacco Smoke	The mixture of smoke given off by the burning end of a cigarette, pipe, or cigar, and the smoke that is exhaled by the smoker	Cigarette, pipe and cigar smoke
Radon	Naturally occurring radioactive colorless and odorless gas produced by the decay of uranium.	Earth and rock beneath buildings; well water; building materials. Radon is more prevalent in mountainous and rocky regions. It seeps into buildings from the soil beneath and is usually found in highest concentrations in basements.
Biological Contaminants	Mold, dust mites, pet dander (skin flakes), cockroaches, rodents and other pests or insects	Found most often in areas associated with food and moisture or water (e.g., kitchens, humidifiers, unvented bathrooms); areas where dust collects (e.g., draperies, bedding, carpet)
Combustion Byproducts	Gases (such as carbon monoxide, nitrogen oxides, sulfur dioxide) and particles generated from burning materials.	Gas or wood ranges, stoves, furnaces and space heaters that are not vented to the outside, as well as auto, truck or bus exhaust from attached garages, nearby roads, factories and power plants, and idling vehicles in parking areas
Volatile Organic Compounds	Liquids or solid chemicals that contain carbon and vaporize at normal room temperatures.	Gasoline, household cleaning products (rug and oven cleaners), air fresheners, adhesives, paints and lacquers, paint strippers, dry-cleaning fluids, building insulation, pressed wood products used in building and furniture construction, and graphics and craft supplies such as glues and permanent markers
Particulate Matter	Smoke, soot and dust particles suspended in the air. Dust particles may contain lead, pesticide residues, asbestos, or other toxic materials. When inhaled, these fibers are often small enough to be breathed deep into the lungs where they can attach and accumulate.	Soil, fleecy surfaces, pollen, lead-based paint, burning wood, oil, or coal, automobile exhaust, factories

Source: National Training Institute for Child Care Health Consultants, 2004

these programs address growing concerns and issues about protecting children's health, particularly from potential exposures in the school environment.

Sources of Air Pollution in ECE Programs

- **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 ECE program to industrial or agricultural sites and/or highways and the ambient air quality for the respective geographical region present the major hazards for outdoor air pollution.

- **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 percent of their time indoors, means that children's exposure to indoor air pollutants may be two to five times higher, and sometimes 100 times higher, than their exposure to outdoor air pollutants (U.S. Department of Health and Human Services, 2000; EPA, 2002a). See *Handout: Health and Safety Notes: Indoor Air Quality*.

Two studies have investigated indoor air quality in ECE programs (Daneault, Beausoleil, & Messing, 1992; Li, Hsu, & Tai, 1997). Daneault et al. found elevated levels of carbon dioxide (CO2) in ECE programs in Montreal during winter afternoons indicating poor ventilation. Li et al. (1997) found a high percentage of dampness, visible mold, stuffy odors, and water damage in ECE programs in Taiwan. The degree of dampness was positively related to the frequency of reported respiratory symptoms in the ECE staff.

Health Effects of Air Pollution Exposure

- **Acute effects.** Most often, the immediate effects of exposure are associated with respiratory disorders. The principal symptoms are: watery eyes, burning sensations in the eyes, nose and throat, nasal congestion, chest tightness, difficulty breathing, irregular breathing, coughing, and wheezing. Other signs are headaches, dizziness, weakness, fatigue, and chest pain (AAP, 2003).

  When children exhibit symptoms commonly associated with air pollutants (see above) the following actions should be taken immediately (AAP, 2003):

  - Identify suspected pollutants.
  - Remove or decrease exposure to the suspected air pollutants. Either remove suspected polluting agent or remove children from the environment.
  - If pollutant is indoors, increase ventilation. Open windows and doors to the outside.

- **Chronic effects.** In addition to the acute effects described above, which are usually temporary, air pollution is associated with more serious long-term health problems such as asthma, cancer, and respiratory infections. All long-term effects depend upon the amount and length of exposure. For more information on asthma, see the *Asthma Information Packet* (California Childcare Health Program [CCHP], 2005) (http://wwwucsfchildcarehealth.org/html/pandr/trainingcurrmain.htm#asthma).

Detection of Air Pollution Problems in ECE Programs

Symptoms can provide a useful indicator of air pollution problems (AAP, 2003). As mentioned above, the acute effects of air pollutants are usually irritations to the respiratory system, headaches, nausea, and dizziness. Unfortunately, these manifestations are also the symptoms of common allergies, respiratory infections, and flu. Furthermore, when symptoms occur, multiple pollutants may be involved simultaneously. The key to detection is that symptoms usually abate when the toxic exposure is eliminated. The important step is to note the time and place where symptoms occur and whether a number of children are affected (although some children are much more sensitive to certain pollutants than others). For example, if symptoms like those described above occurred in the ECE program only after the carpeting and wall paneling had been professionally cleaned, and subsided when the children left the building, this would suggest that air pollution associated with these cleaning activities may be a causal factor.

Table 3: Checklist for Signs of Possible Indoor Air Quality Problems in ECE Programs

When consulting with an ECE program, the CCHC should:

Observe

- The general level of cleanliness
- Presence of mold or mildew
- Dirty or faulty central heating or air conditioning equipment such as dirty air filters or ducts
- Damaged flue pipes or chimneys
- Blocked vents or air intakes
- Unvented combustion air sources for fossil fuel (e.g., gas, wood, or kerosene) appliances
- Tight building construction or evidence of remodeling
- New furniture or carpeting
- Improperly stored chemicals

Smell

- Unusual and noticeable odors, such as mold, mildew or "chemical" smells
- Stale or stuffy air

Feel

- Noticeable lack of air movement
- Excessive humidity
- Uncomfortable air temperatures
- Air flowing into and out of vents
- Drafts

Listen for

- Concerns of staff regarding indoor air quality
- Unusual equipment noises
- Air blowing out of supply vents

Adapted from EPA, Montana State University Extension Service and U.S. Department of Agriculture [USDA]. Healthy Indoor Air for America's Homes Program, 2002; and US Environmental Protection Agency Indoor Air Quality Tools for Schools Kit – Walkthrough Inspection Checklist, 2002.

Identifying Outdoor Air Hazards

Ambient outdoor air pollution levels can vary from day to day. The best method for keeping track of such changes depends upon your location.

- **Metropolitan areas.** In many metropolitan areas, local radio stations, TV news programs, and newspapers provide regular updates on air quality conditions. Various Web sites also list weather conditions and air quality updates daily. One useful Web site is: www.weather.com/activities/health/airquality/?from=healfl.

- **Rural areas.** In more rural areas, pollutant levels may require more aggressive information seeking strategies. Two government sources of information about community air quality measurements are state departments of environmental protection and regional EPA offices. The California Air Resources Board (ARB) gathers air quality data around the State of California and sets air quality standards for the state. ARB provides maps of areas that violate national and state air quality standards (see the ARB Web site, http://www.arb.ca.gov/homepage.htm). A third source is the Environmental Defense Organization Scorecard. Environmental Defense is a public action organization that provides a scorecard of summary information on ambient air pollution by zip code and identifies the major polluters (industrial or agricultural activities, etc.) in each zip code region. Information can be found on their Web site: www.scorecard.org. However, it does not provide daily updates of ambient air quality conditions.

Identifying Indoor Air Hazards

Air pollutants are ubiquitous in the indoor environment, and given our current lifestyle, their complete elimination is not practical. Volatile organic compounds alone are used in common household consumer products such as oven and rug cleaners, air fresheners, water repellents, paints, lacquers, building materials and furnishings. Carbon monoxide is a deadly gas that can come from appliances that burn gas, oil, coal, or wood, and are not working as they should. See Table 3 for a checklist of signs of possible indoor air pollution.

Actions for Prevention and Management of Air Pollution Exposure

Reduction and/or management of indoor air pollutants is critical to insure a healthful environment. When symptoms are not noticeable, the first step in this task is identification and awareness of potential hazards in the environment. Some investigations may be easily carried out by the CCHC and/or the Child Care Health Advocate (CCHA) (e.g., radon), while others require professional expertise and training (e.g., asbestos). For assistance with, and/or information about, state testing regulations and educational programs for indoor air pollutants, each state provides a radon contact and an indoor air quality coordinator. The list of all state contacts is available from the EPA (EPA, 2002h). For more information about California-based resources, see the Web site for Cal/EPA, http://www.calepa.ca.gov/.

In general, the EPA and CPSC (1995) specify that the primary methods for preventing and managing indoor air pollution problems are removal or reduction of the source of pollution and an increase in ventilation. A third possible method is *air cleaners/ filters*. A variety of types of air cleaners are available (e.g., furnace filters) and may reduce some dust and liquid substances suspended in the air. The EPA has not issued an opinion either for or against the use of air cleaning devices. However, it does state that air cleaners should be used *only in addition to and never as a replacement or substitute for* the other two methods (source control and ventilation) [EPA and CPSC, 1995]. The EPA and CPSC are continuing to evaluate air cleaners currently on the market and seeking ways to improve them.

See *Handout: Child Care Inventory for Air Pollution Hazards* for an inventory of specific air hazards to look for in the ECE environment. This handout also summarizes specific actions for management and prevention of exposures recommended by the National standards (AAP et al., 2002), AAP (2003), EPA (2002b), and Vermont Department of Health (1998).

Pesticides

The EPA defines pesticides as "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses" (EPA, 2002c). In the United States, over 4 billion pounds of pesticides are used each year (Crain, 2000). Pesticides are everywhere around us: in our food, homes, schools, ECE programs, parks, rivers and air. And their toxicity is without question. As the EPA (2002c) states:

> 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 other words, what is poisonous to bugs and animals is also poisonous to humans. Also, 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.

Sources of Pesticides in ECE Programs

Children are exposed to pesticides both indoors and outdoors. They consume water and foods that have pesticide residues, and they breathe contaminated air. See *Handout: Health and Safety Notes: Keeping Children Safe from Pests and Pesticides.*

Outdoor sources of pesticides

- **Proximity to agricultural sites, golf courses, power lines, etc.** Due to commercial spraying, children who live and play in or near these areas 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. Baker, Fitzell, Seiber, Parker, Shibamoto, & Poore (1996) measured ambient air concentrations of some carcinogenic pesticides near beet and potato fields in California and found air levels of some of these substances to be far in excess of the federally indicated safe levels. 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.

- **Residental/community spraying.** In 1995, homeowners used nearly 133 million pounds of pesticides, herbicides and fertilizers on their lawns and gardens alone (Hayhurst, 1999). Young children are at greater risk for exposure to lawn and garden pesticides because their crawling and play behaviors increase their contact with grass and ground surfaces, and their hand-to-mouth behaviors make it more likely that they will ingest pesticide residues from their hands.

  A number of pesticides and herbicides commonly used in lawn and garden care such as, 2,4-D, permethrin, and glyphosate are classified as probable or possible carcinogens by the EPA (National Pesticide Information Center, 2002). Not only are ECE facilities at risk when they apply these pesticides on their own lawns and gardens, but inadvertent exposure can occur when pesticides are applied without notice on neighboring properties.

  To limit the likelihood of inadvertent exposure, some states have established regulations authorizing counties to adopt 'neighbor notification' laws for *commercial and residential* lawn applications (AAP et al., 2002, Standard 5.073). Also, some states have a state *pesticide sensitivity list* whereby vulnerable residents are notified of impending pesticide applications in their area. In states where this is possible, the National Standards (AAP et al., 2002) recommend that ECE providers contact their state pesticide agency and request that their facility be added to the list.

- **Playgrounds.** Most wooden playground structures, picnic tables, and decks are made of treated wood that has been injected with chromated copper arsenate (CCA), a wood-preserving pesticide composed of arsenic, copper, and chromium (Jahn & Payne, 2002). This preservative protects the lumber against termites, beetles and rot. However, arsenic is a known human carcinogen. Over time, investigations show that the CCA steadily leaches from the treated wood into the surrounding soil. Children can absorb the arsenic preservatives through their skin when they touch the wood or nearby contaminated dirt or sand. They ingest it when they then put their hands in their mouths. Moreover, pressure treated wood poses a great hazard when it is burned and releases the treatment chemicals into the air. In 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. In 2004, the EPA restricted CCA products from residential use by federal law.

  Older structures built with CCA treated wood (including those in ECE programs) are not affected by this action. Moreover, the EPA does not recommend that CCA treated playground equipment and other residential uses of this wood should be automatically replaced because it has not yet determined that CCA treated wood poses an unreasonable risk to the public or the environment (Jahn & Payne, 2002). Jahn and Payne suggest some alternatives to replacement of CCA treated wood. They note that three types of wood coatings (latex primer followed by one coat of outdoor latex paint; oil-based primer followed by one coat of oil-based paint; ortwo coats of a penetrating oil semi-transparent deck stain) 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 wear and tear deterioration.

- **Insect repellents.** Insect repellents are designed to be applied to people's skin to repel insects rather than kill them. DEET is the active ingredient in most insect repellents. It was developed by the U.S. Army during World War II and registered for general public use in 1957 (EPA, 2005). DEET is toxic when swallowed, and high levels applied to the skin can cause blistering. *For children, AAP (2003) recommends using repellents containing no more than 10% DEET*. DEET repellents should be used very sparingly on children aged 2 to 6, and not at all on infants and children under age 2. Also, insect repellents should not be applied to children's hands to prevent children from eating DEET (CCHP, 2004). See *Handout: Health and Safety Notes: The Use of Insect Repellent by Child Care Programs.* More natural insecticides, such as citronella (for example, Avon's Skin-So-Soft® bath oil) and soybean oil, are not as effective as DEET in preventing insect bites and also need to be reapplied often. 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 & Freeman, 2000). The use of insect repellent in ECE programs requires written consent from parents (AAP et al., 2002).

  Other precautions for using DEET-based repellents on young children include:

  - Use DEET sparingly on exposed skin only.
  - Do not use DEET on the hands of young children, nor around the eyes, mouth, or near irritated skin or open sores.
  - Do not apply under children's clothing; instead apply a light coating of DEET on the surface of clothing. After coming indoors, wash the clothing to remove the DEET.
  - Avoid spraying DEET in enclosed areas and do not use DEET around food.
  - Read product labels carefully and follow directions exactly.

Indoor sources of pesticides

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 (National Pesticide Telecommunication Network, 2005).

Residue from both indoor and outdoor pesticide treatments have been found in carpet dust days and weeks after the pesticide application (Gurunathan et al., 1998; Nishioka, Burkholder, Brinkman, Gordon and Lewis, 1996). Pesticides persist longer in indoor environments because of the lack of 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). Common pesticides used inside the house include: cockroach sprays and baits; rat and other rodent poisons; flea and tick sprays, powders, and pet collars; kitchen/laundry/bath disinfectants and sanitizers; products that kill mold and mildew; and head lice shampoo (EPA, 2002e). See *Handout: Less toxic alternatives to common hazardous products.*

- **Food.** The AAP (2003) 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, 2003). The EPA sets standards for allowable levels of pesticides in foods, and 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. ECE programs 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**.** For more information, see *Handout: Pets in the Child Care Setting.*

Health Effects of Pesticide Exposure

Acute effects. Acute effects of pesticides range from irritation of the eyes, nose and throat, mild dizziness, nausea, and vomiting, diarrhea, headaches, skin rashes, to severe illness and death (AAP, 2003). More severe reactions usually result from massive doses in accidental poisoning, chemical spills, inappropriate application, or prolonged exposure.

Chronic effects. 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, 2003). Long term effects of pesticides depend upon toxicity of the pesticide itself, the length of exposure, and/or the amount of exposure.

One of the few studies of young children's chronic exposure to pesticides suggests alarming results. Guillette, Meza, Aquilar, Soto and Gracia (1998) compared two groups of rural pre-school children from northwest Mexico. One group lived in an agricultural area subject to a high level of pesticide use. The second group lived in the foothills where pesticide use was rare. Guillette et al. observed significant differences between the two groups on tests of visual-motor integration. The performance of the children from the foothills was within normal ranges; that of the children from the agricultural region suggested visual-motor impairment.

Detection of Pesticide Problems in ECE Programs

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 (2003) reports that even laboratory tests are often not diagnostically useful. In lieu of clear symptoms, see Table 4 for a series of questions that may prove helpful in detecting and preventing pesticide problems in the ECE environment.

Actions for Prevention and Management of Pesticide Exposure

One approach to controlling long-term pests is called Integrated Pest Management (IPM). IPM is a relatively new approach to long-term pest control. It relies on both chemical and non-chemical methods. The goal of IPM is to utilize the pest control alternative that is least toxic to people and the environment, and to use the least amount of treatment necessary in the management of any given pest problem. With this approach, instead of regular and/or automatic spraying, etc., to manage indoor insect problems, strategies might include:

- repairing screens and caulking around windows to prevent pests from entering
- restricting food consumption to certain areas
- emptying trash cans at the end of the day
- storing food in containers with tightly fitting lids
- vacuuming up the eggs of fleas before they hatch
- keeping foods cleaned up in the kitchen

Outdoor pest control strategies might include:

- keeping vegetation shrubs and wood mulch at least one foot away from structures
- reducing clutter that provide pests' easy places to hide
- using trash cans with tightly fitting lids
- choosing plants suited to the soil and climate of the site so that fungicides, herbicides, and insecticides are less necessary

- using predators like ladybugs to control unwanted insects

Another feature of IPM is that regularly scheduled pesticide treatments (e.g., every 3 months) are replaced by treatments given only as *needed* and as a last resort when less toxic treatments have been ineffective. Treatments are also chosen and timed to be least hazardous to nontargeted organisms. The use of pesticides that are labeled "Caution" rather than "Danger" or "Warning" is encouraged and the use of spot treatments rather than area wide applications is recommended by IPM. As part of its continuing effort to protect children from unnecessary exposure to pesticides, the EPA (2002e) encourages school officials (and presumably ECE facilities) to adopt IPM practices.

Water Pollution

Safety of water is important to child health (AAP, 2003). Children drink more water per kilogram of body weight than adults. Of the earth's water, only 3 percent is fresh, and of that 3 percent, only 1 percent is available for human use. Clearly, water is a precious and relatively rare resource whose preservation is essential to public health and survival. The U.S. 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 (EPA, 1999a). 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. While the EPA has set minimum requirements for water quality, levels above this minimum depend upon the condition of the water source and the quality of the treatment facility (EPA, 1999a). Under the Safe Drinking Water Act of 1974, public water suppliers must monitor their water to make sure it complies with public health standards set by the EPA. Water suppliers are bound by law to notify customers immediately if contamination poses an urgent health threat. Any supplier's violation of a drinking water standard requires public notice (EPA, 1999b). 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. For more information on California water, see the State Water Resources Control Board Web site, http://www.waterboards.ca.gov/.

Sources of Water Pollution in ECE Programs

Hundreds of biological agents (bacteria, viruses, parasites) and thousands of chemicals are found in fresh water supplies. The EPA has established standards for only 90 water contaminants, seven of which were established in January, 2002.

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. Private wells are not federally regulated and must be maintained by the homeowner. AAP (2003) 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."

Health Effects of Exposure to Water Pollution

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 and developmental problems, and other chronic health effects (AAP, 2003). Little is known of long-term health effects of most water pollutants.

Detection of Water Pollution Problems in ECE Programs

Even with state-of-the-art water treatment systems, sporadic and epidemic waterborne illnesses can occur. The AAP (2003) reports the most prominent symp-

toms of such illnesses are mild gastroenteritis with diarrhea. While these symptoms are often nonspecific as to source, an outbreak of such symptoms in the ECE program may indicate water contamination.

Accurate detection of water contamination requires professional expertise. Public water quality is monitored by the municipal water supplier as required by the EPA and state environmental agencies. Any indication of public water contamination should be directed to the state health and environmental agencies and to the water supplier. Although the testing of private wells is the responsibility of the homeowner, states may provide this service at no cost. Private well water should be tested at least annually (AAP, 2003). To determine if their well water should be tested and to locate a professional for testing, ECE providers should contact local health and environmental departments.

Actions for Prevention and Management of Water Pollution Exposure

See *Handout: Child Care Inventory for Water Pollution Hazards* for an inventory of specific water pollution hazards to look for in the ECE environment. This handout summarizes specific actions for management and prevention of exposures recommended by AAP et al. (2002), AAP (2003), EPA (1999b), and Mott et al. (1997).

Assessment of Environmental Hazards in ECE programs

A major role of the CCHC is to help the ECE provider assess actual and potential environmental risks in the ECE program. In addition to adequate knowledge of the risks, strong observational and interviewing skills are critical for this task. CCHCs should reassure ECE providers that their role is not regulatory, but that CCHCs are mandated reporters when the health or safety of the children is significantly jeopardized, and that CCHCs do advocate the implementation of the standards.

In order to assess environmental hazards, it is recommended that standardized tools such as the ones described below be used. These formal and informal checklists address environmental health hazards for children:

- Early Childhood Environmental Rating Scales [ECERS] (Harms, Clifford & Cryer, 1998)
- CCHP Health and Safety Checklist-Revised (2005)
- American Academy of Pediatrics, Pennsylvania Chapter. ECELS Program Safety Checklist (1999)
- Indoor Air Quality Tools for Schools' Walk-through Inspection Checklist (EPA, 2002b)
- Sample Pest Management Survey in the report "Poisoned Schools: Invisible Threats, Visible Actions" (Center for Health, Environment, and Justice, 2001)
- 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 (National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program, and School Asthma Education Subcommittee, 2002)
- Child Care Program Chemical Hazard Survey and Action Plan (California Childcare Health Program, 2004)

Table 4: Checklist for Signs of Possible Pesticide Problems: Questions for ECE Providers

Why does the facility have pests?

_____

_____

_____

_____

What pesticides are used inside or outside the child care facility?
(Examples: bug or weed killers, mold or mildew sprays, flea or tick sprays)

_____

_____

_____

Are they used routinely? ❑ Yes ❑ No

Have they been used recently? ❑ Yes ❑ No

Do people or businesses in the neighborhood routinely use pesticides for lawns or facilities? ❑ Yes ❑ No

Is the ECE program in or near an agricultural community? Golf course? Power lines? ❑ Yes ❑ No

Does the ECE program always wash fruits and vegetables or peel them before using? ❑ Yes ❑ No

Does the ECE program follow a recommended hand-washing policy? ❑ Yes ❑ No

Does the ECE program use public water or well water? ❑ Yes ❑ No

If well water is used, has the water been checked for contamination? ❑ Yes ❑ No

How often? _____

When was the last time it was checked? _____

How are pesticides and hazardous products stored in the ECE program?

_____

How are they disposed of?

_____

Does the facility follow Integrated Pest Management techniques? ❑ Yes ❑ No

How can the facility reduce the use of pesticides and hazardous substances?

_____

_____

Adapted from Children's Environmental Health Project, 2000

WHAT THE CCHC NEEDS TO DO

Observe Programs and Assess Environmental Hazards

The CCHC can observe an ECE program with the ECE provider and list any environmental hazards that are present in the program. The CCHC's role is to assist the ECE provider in:

- identifying and prioritizing the key environmental hazards
- establishing policies for managing these hazards
- developing strategies for implementing policies

Help Develop Policies

The CCHC should assist the ECE 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 implemented. Recommend periodic revision of present policies and procedures, and provide sample policies and procedures to be given to the ECE provider.

Educate Staff on Potential Environmental Hazards

The CCHC should be active in educating staff on potential environmental hazards, paying special attention to unseen hazards. Use clear examples and do a "walk-through" of the facility with staff members. The use of a facility-specific checklist will assure consistent monitoring of trouble spots. Help ECE providers understand that children are uniquely vulnerable to environmental hazards.

Provide Educational Materials

Provide educational materials in multiple languages as necessary. Use visual aids when available. Discuss the use of handouts for parental awareness of environmental health issues. Share resources with providers and parents regarding where they can get additional information (books, Web sites, journals, and organizations).

Mediate Communication Between the ECE Providers and Health Specialists

Particularly in a field like environmental science where information develops rapidly and highly technical expertise is often required, an important role of the CCHC is to mediate communication between ECE providers and environmental health specialists. ECE issues must be highlighted for environmental health specialists, and environmental health information may need interpretation and clarification for ECE providers.

To accomplish this communication task, the CCHC must:

- Stay attuned to current trends and issues in the environmental health field and be familiar with key environmental health concepts; relationships between health and the environment; and the various ways people and disciplines define the environment.
- Remain sensitive to the perspectives and needs of the ECE staff regarding environmental health issues and recommendations.

Be Aware of Local Environmental Hazards

The CCHC 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 information publicized? Through local news media? State department of environmental protection? Nearest EPA regional office?

Help Evaluate Media Information

The CCHC can help the ECE provider evaluate the media information s/he receives about environmental

health and children, and use it to make good choices for the ECE program.

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 a 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?

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. We risk the possibility of choking or food poisoning every time we eat. 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 CCHCs and ECE providers.

Advocate for the Prevention of Exposure to Environmental Hazards

By the very nature of the services they perform, CCHCs 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 ECE programs, the community, and the state. Child advocacy is at the center of the CCHC job description. In the field of environmental health there is much work for the CCHC to do. Just a few examples are presented below.

In the ECE program, the CCHC can:

- Incorporate environmental themes into educational presentations and activities for both providers and parents.
- Work with ECE staff to make ECE programs models of effective Integrated Pest Management techniques.
- Perform a chemical hazard survey (see *Handout: Chemical Hazard Survey*).
- Encourage ECE providers to obtain and post MSDS for every chemical used.
- Promote routine preventive health care for children where screening for lead may take place.
- Ensure that the ECE program is kept clean (see *Handout: Health and Safety Notes: Cleaning and Sanitizing*).

In the community, the CCHC 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 California, the CCHC can:

- Petition state pesticide officials to create a statewide 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.

Link Programs with Resources

Identification of environmental risks and preventive actions often requires expert support. To perform his/her job well, the CCHC 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 CCHC will probably need to field a variety of expert resources to cover the areas of concern to ECE programs.

WAYS TO WORK WITH CCHAs

The CCHC can help the CCHA to inspect the environment where children spend time and point out hazards and identify possible areas of risk. Assist the CCHA in exploring the risks further and developing a plan to prevent the children from coming into contact with the hazard while remediation is carried out. The CCHC can help the CCHA to create a library for children, parents, and staff about environmental health issues including books, videos, posters, and Web sites. The CCHC can ensure that the educational materials available are appropriate for the ECE program in terms of the language and cultural needs of the individuals being served in the program.

ACTIVITY 1: ECE PROGRAM CONSULTATION ON ENVIRONMENTAL HEALTH ISSUES

Review the following five situations that may arise in ECE programs:

1. A parent called, stating that the personnel at her daughter's ECE program are routinely spraying the children's hands and arms with Lysol spray.
2. An ECE program director called saying her program's kitchen is being remodeled, and she suspects the ceiling tiles are asbestos.
3. A family care provider called and asked if she needed to treat the sandbox sand with a bleach solution or pesticide because fleas were seen on two of the children in her program.
4. The director of an ECE program located on a school campus called with a concern about the school and program being fumigated during the summer when school was closed but the ECE program was open.
5. A parent complained that her family child care provider lets the toddlers play naked in the wading pool in her back yard. The children, who sometimes urinate in the water, drink the water despite the caregiver's best attempts to prevent it.

For each situation, answer the questions below:

1. How would you assess this situation?
    - What information do you need to further investigate the problem?
    - What questions would you ask?
    - What advice and/or information would you offer to the ECE staff?

2. Is there any necessary follow-up? And if so, what specifically would it be?

3. What resources would you share with the ECE programs?

ACTIVITY 2: POLICY DEVELOPMENT

In small groups, select one environmental hazard for children in ECE programs. What specific policies should the CCHC recommend to reduce exposure to this hazard? Complete the questions below to develop a plan of action.

Overall objective(s):

Steps to take to accomplish the objective(s):

How will you know you have achieved your objective?

Who will you ask for help?

ACTIVITY 3: REVIEW CHEMICAL HAZARDS IN ECE PROGRAMS

In small groups, brainstorm where chemicals in an ECE program may be found and list them by name and location.

Review *Handout: Chemical Hazard Survey and Action Plan* and *Handout: Less Toxic Alternatives to Common Hazardous Household Products.* Discuss how you would apply the chemical hazard survey questions to those chemicals listed from the brainstorm. What alternative products can be used?

NATIONAL STANDARDS

From *Caring for Our Children: National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs, Second Edition*

Lead

3.020 Situations that Require Handwashing
4.029 Tableware and Feeding Utensils
5.061 Testing for Lead Levels in Drinking Water
5.110 Testing for Lead
5.111 Construction and Remodeling During Hours of Operation
5.138 Lead Content of Water from Drinking Fountains
5.179 Hazardous Chemicals in the Soil of Play Areas
5.195 Toxic Materials Used on Outdoor Play Equipment
5.231 Structure Maintenance
8.048 Contents of Child's Health Report

Air Quality: General

5.169 Fencing and Outdoor Hazards
5.231 Structure Maintenance
5.232 Electrical Fixtures and Outlets Maintenance
5.233 Plumbing and Gas Maintenance
5.234 Cleaning of Humidifiers and Related Equipment

Air Quality: Biological Contaminants

3.026 Prevention of Exposure to Blood and Bodily Fluids
3.028 Routine Frequency of Cleaning and Sanitation
3.034 Selection of Surfaces and Materials
5.079 Floors, Walls, and Ceilings

Air Quality: Combustion By-Products

5.032 Heating and Ventilation Equipment Inspection and Maintenance
5.033 Type and Placement of Thermometers
5.034 Gas, Oil or Kerosene Heaters, Portable Gas Stoves and Charcoal Grills
5.036 Inspection of Heating Systems
5.038 Fireplaces
5.229 Furnace and Boiler Maintenance

Air Quality: Humidity and Ventilation

5.028 Indoor Temperature and Air Exchange
5.029 Art Materials and Ventilation
5.031 Air Recirculation Systems
5.041 Humidifiers and Dehumidifiers
5.042 Levels of Illumination

Air Quality: VOCs and Other Chemicals

5.011 Separation of Operations from Child Care Areas
5.100 Use and Storage of Toxic Substances
5.102 Informing Staff Regarding Presence of Toxic Substances
5.105 Proper Use of Arts and Crafts Materials
5.108 Ventilation of Recently Carpeted or Paneled Areas
5.109 Prohibition of Materials Emitting Toxic Substances

Air Quality: Asbestos

5.104 Preventing Exposure to Asbestos or Other Friable Materials

Air Quality: Environmental Tobacco Smoke

3.041 Tobacco Use and Prohibited Substances
8.038 Policies Prohibiting Smoking, Tobacco, Alcohol, Illegal Drugs, and Toxic Substances

Air Quality: Radon

5.007 Use of Basements
5.103 Radon Concentrations

Pesticides

5.105 Proper Use of Arts and Crafts Materials
5.070 Control of Animal Waste and Pests
5.071 Protection of Openings from Rodent Entry
5.072 Protection of Openings from Flies and Insects
5.073 Type and Use of Pesticides and Herbicides

5.074 Testing for Unsafe Levels of Toxic Chemicals
5.100 Use and Storage of Toxic Substances
5.202 Insect Breeding Hazard

Water Quality

5.055 Water Supply
5.056 Water Handling and Treatment Equipment
5.057 Cross-Connections
5.058 Installation of Pipes and Plumbing Fixtures
5.062 Water Test Results
5.063 Emergency Safe Drinking Water and Bottled Water
Appendix I: Selecting an Appropriate Sanitizer

CALIFORNIA REGULATIONS

From *Manual of Policies and Procedures for Community Care Licensing Division*

101231 Smoking Prohibition
101238 Building and Grounds
101238.2 Outdoor Activity Space:
101238.3 Indoor Activity Space
101238.4 Storage Space
101239 Fixtures, Furniture, Equipment and Supplies
101239.2 Drinking Water

RESOURCES

General Environmental Health Organizations and Resources	
Organization and Contact Information	**Description of Resources**
Center for Health, Environment and Justice www.chej.org	Helps grassroots groups and individuals build upon their strengths. Through organizing leadership development research and technical assistance, they empower individuals with skills and information to make sound judgments and become a part of the political decision-making process to protect health and our natural resources. Publication: Childproofing our communities: Why children need special protection from toxics. www.childproofing.org/vulnerable.html.
Children's Environmental Health Network Headquarters: 110 Maryland Avenue NE, Suite 505 Washington, DC 20002 (202) 543-4033 phone (202) 543-8797 fax www.cehn.org California office: 1604 Solano Avenue Berkeley, California 94707 (510) 526-0081 phone (510) 526-3672 fax	A national multi-disciplinary project whose mission it is to promote a healthy environment and to protect the fetus and child from environmental hazards. Publishes a resource guide on children's environmental health. The Network has worked on the national level since 1992 and has focused on the areas of research, policy and education. The network has both scientific and community listserves that provide persons involved in the children's environmental health field an opportunity to communicate important news in the field. A chronology of children's environmental health can be found at: www.cehn.org/cehn/Chronology.html
Environmental Defense 257 Park Avenue South New York, NY 10010 (212) 505-2100 phone (212) 505-2375 fax www.environmentaldefense.org/home.cfm	Environmental Defense is a national nonprofit organization which links science, economics and law to create innovative, equitable and cost-effective solutions to society's most urgent environmental problems. www.scorecard.org provides an in-depth pollution reports by county, covering air, water, and chemicals.
United States Environmental Protection Agency (EPA) Office of Children's Health Protection http://yosemite.epa.gov/ochp/ochpweb.nsf/homepage	In 1995, the EPA was directed to take into account environmental health risks to infants and children in all risk characterizations and public health standards set for the United States. Web site lists tips to protect children from environmental hazards, publications, and other resources.

General Environmental Health Publications

Carson, R. (1962). *Silent spring.* Greenwich, CT: Fawcett Publications.

Head Start Bureau (1997). *Training guides for Head Start learning community: Sustaining a healthy environment.* Washington, DC: Head Start Information and Publication Center. Retrieved June 7, 2005, from http://www.bmcc.edu/Headstart/Trngds/Sustaining.

U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment (2002). *Child-specific exposure factors handbook (Interim Report)*. Washington, DC: EPA.

Lead Related Organizations and Resources	
Organization and Contact Information	**Description of Resources**
Alliance for Healthy Homes 227 Massachusetts Avenue, N.E. #200 Washington, DC 20002 (202) 543-1147 phone (202) 543-4466 fax www.afhh.org	Seeks to protect children from lead and other environmental health hazards in and around their homes by advocating for policy solutions and building capacity for primary prevention in communities throughout the U.S. Sponsors two list serves related to lead poisoning prevention and healthy homes: Leadnet and Healthyhomesnet.
Centers for Disease Control and Prevention Childhood Lead Poisoning and Prevention Program Division of Environmental Hazards and Health Effects National Center for Environmental Health www.cdc.gov/nceh/lead/lead.htm	The agency was created as a result of the Lead Contamination Control Act of 1988. It provides funding to state and local health departments to determine the extent of childhood lead poisoning, screen children for elevated blood lead levels, help ensure that lead-poisoned infants and children receive medical and environmental follow-up, and develop neighborhood-based efforts to prevent childhood lead poisoning.
The National Lead Information Center (NLIC) (800) 424-LEAD (5323) www.epa.gov/lead/nlic.htm	Provides information about lead hazards and their prevention. Operates under a contract with the U.S. Environmental Protection Agency (EPA), with funding from EPA, the Centers for Disease Control and Prevention, and the Department of Housing and Urban Development. Downloadable materials available.
National Resources Defense Council 40 West 20th Street New York, NY 10011 (212) 727-2700 phone (212) 727-1773 fax www.nrdc.org NRDC REGIONAL OFFICES 111 Sutter St., 20th floor San Francisco, CA 94104 (415) 875-6100	Fact sheet about Lead Paint in Schools in English and Spanish can be found at: www.nrdc.org/health/kids/qleadsch.asp
United States Department of Housing and Urban Development (HUD) 451 7th Street S.W. Washington, DC 20410 (202) 708-1112 www.hud.gov	HUD's mission is to increase homeownership, support community development and increase access to affordable housing free from discrimination. Publication: Eliminating Childhood Lead Poisoning: A Federal Strategy Targeting Lead Paint Hazards. President's Task Force on Environmental Health Risks and Safety Risks to Children. www.hud.gov/offices/lead/reports/fedstrategy2000.pdf. This report focuses primarily on expanding efforts to correct lead paint hazards (especially in low-income housing), a major source of lead exposure for children.

Lead Related Publications

Centers for Disease Control and Prevention. (2002). *CDCs lead poisoning prevention program.* Retrieved August 23, 2005, from http://www.cdc.gov/nceh/lead/factsheets/leadfcts.htm.

Air Pollution Related Organizations and Resources	
Organization and Contact Information	**Description of Resources**
American Academy of Allergy, Asthma, and Immunology 555 East Wells Street, Suite 1100 Milwaukee, WI 53202-3823 (414) 272-6071 www.aaaai.org	Provides descriptions of many different types of allergies and of asthma; provides a medication guide; lists pollen counts. Resources also available in Spanish.
Asthma and Allergy Foundation of America 1233 20th Street, NW, Suite 402 Washington, D.C. 20036 (202) 466-7643 phone (202) 466-8940 fax www.aafa.org	AAFA provides practical information, community based services and support through a national network of chapters and support groups. AAFA develops health education, organizes state and national advocacy efforts and funds research to find better treatments and cures. AAFA also offers asthma care training for children, and asthma and allergy essentials for ECE providers.
California Indoor Air Quality (IAQ) Program 850 Marina Bay Parkway (M.S. G365 / EHLB) Richmond, CA 94804 (510) 620-2874 phone (510) 620-2825 fax www.cal-iaq.org	The mission of the California Indoor Air Quality (IAQ) Program is to conduct and promote the coordination of research, investigations, experiments, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, and control of indoor pollution in California. The Indoor Air Quality Assistance Hotline offers guidance and information about indoor air quality issues.
Healthy Indoor Air for America's Homes Montana State University Extension Service Taylor Hall Bozeman, MT 59717 (406) 994-3451 phone (406) 994-5417 fax www.healthyindoorair.org www.montana.edu/wwwcxair	A national consumer education program concerned with improving the quality of indoor air in homes. Helps provide awareness of indoor air quality issues such as radon, secondhand smoke, asthma, lead, combustion gases and carbon monoxide, formaldehyde, molds and other biologicals, asbestos, and air hazards associated with home remodeling, carpeting and household products. This is a partnership program of the U.S. Environmental Protection Agency-Indoor Environments Division, Montana State University Extension Service Housing Program, and the U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service.
National Safety Council Radon Hotline (800) SOS-Radon (1-800-767-7236) www.nsc.org/ehc/radon.htm	Radon Hotline provides an informational recording 24 hours a day. Through this automated system, callers can order a brochure on radon which contains information on ordering a low-cost short-term test kit.
U.S. Environmental Protection Agency Indoor Air Quality www.epa.gov/iaq	Contains fact sheets on sources of indoor air pollution and health effects including: volatile organic compounds, mold, radon, smoke-free homes, and asthma. Also in Spanish.

Air Pollution Related Publications

Asthma and Allergy Foundation of America, New England Chapter. (2002). *Controlling asthma triggers at home, at child care, and at school.* Retrieved June 3, 2005, from http://www.asthmaandallergies.org/Controlling.html.

Asthma and Allergy Foundation of America, New England Chapter. (2001). *Information for childcare providers.* Retrieved June 3, 2005, from http://www.asthmaandallergies.org/childcare.html.

Head Start Information and Publication Center (2002). *National training guides: Caring for children with chronic conditions (Module 3): Putting it all together: Caring for children with asthma.* Retrieved June 13, 2005 from, http://www.headstartinfo.org/publications/children_cc/ccccont.htm.

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Pew Environmental Health Commission. (2000). *Asthma attack: why America needs a public health defense system to battle environmental threats.* Retrieved June 13, 2005, from http://healthyamericans.org/reports/files/asthma.pdf.

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U.S. Environmental Protection Agency, Indoor Environments Division. (2000). *Indoor air quality: Tools for schools, IAQ coordinator's guide.* Retrieved August 23, 2005, from http://www.epa.gov/iaq/schools/tools4s2.html.

U.S. Environmental Protection Agency. (1995). *The inside story: a guide to indoor air quality. Basic fact sheets.* Washington, DC: Office of Air and Radiation Retrieved August 23, 2005, from http://www.epa.gov/iaq/pubs/insidest.html.

Pesticide Related Organizations and Resources	
Organization and Contact Information	**Description of Resources**
California Healthy Schools Campaign (888) CPR-4880 www.calhealthyschools.org	Goal is to protect the health of California's children and teachers. Resources available from this Web site include fact sheets and a pesticide action kit with a list of 10 steps to make the environment at schools healthier.
National Pesticide Information Center (NPIC) (800) 858-7378 http://npic.orst.edu	Pprovides objective, science-based information about a variety of pesticide-related subjects, including pesticide products, recognition and management of pesticide poisonings, toxicology, and environmental chemistry. Also lists state pesticide regulatory agencies with links to sites.
Pesticide Action Network North America (PANNA) 49 Powell St., Suite 500 San Francisco, CA 94102 (415) 981-1771 phone (415) 981-1991 fax www.panna.org	Works to replace pesticide use with ecologically sound and socially just alternatives. As one of five PAN Regional Centers worldwide, PANNA links local and international consumer, labor, health, environment and agriculture groups into an international citizens' action network. The Pesticides Database is provides information on current toxicity and regulatory information for pesticides.

Pesticide Related Publications

Centers for Disease Control and Prevention (2002). *Travelers' health. Protection against mosquitoes and other arthropod vectors.* Retrieved June 3, 2005, from http://www.cdc.gov/travel/bugs.htm.

Minnesota Department of Health, Environmental Health Division. (2000). *Facts about chemicals and practical steps you can take to reduce children's exposure.* Minneapolis, MN: Minnesota Department of Health.

U.S. Environmental Protection Agency, Office of Pesticide Programs. (2005). *Alphabetical list of pesticide fact sheets.* Retrieved August 23, 2005, from http://www.epa.gov/pesticides/factsheets/alpha_fs.htm.

U.S. Environmental Protection Agency. (2002). *Pesticides and food: what you and your family need to know.* Washington, DC: Office of Pesticide Programs. Retrieved August 23, 2005, from http://www.epa.gov/pesticides/food.

U.S. Environmental Protection Agency. (1995). *Citizen's guide to pest control and pesticide safety.* Retrieved August 23, 2005, from http://www.epa.gov/OPPTpubs/Cit_Guide/citguide.pdf.

Water Pollution Related Organizations and Resources	
Organization and Contact Information	**Description of Resources**
U.S. Environmental Protection Agency Office of Ground Water and Drinking Water Ariel Rios Building 1200 Pennsylvania Avenue, NW Washington, DC 20460-0003 (202) 564-3750 phone (202) 564-3753 fax www.epa.gov/safewater/index.html	OGWDW, together with states, tribes, and partners, protects public health by ensuring safe drinking water and protecting ground water. Oversees implementation of the Safe Drinking Water Act, which is the national law safeguarding tap water in America. Fact sheet about lead in drinking water can be found at: www.epa.gov/safewater/lead/index.html
Safe Drinking Water Hotline (800) 426-4791	Provides the general public, regulators, medical and water professionals, academia, and media, with information about drinking water and ground water programs authorized under the Safe Drinking Water Act.

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HANDOUTS FOR ENVIRONMENTAL HEALTH MODULE

Handouts from California Childcare Health Program (CCHP), Oakland, CA

Handouts from National Training Institute for Child Care Health Consultants (2004)

CHEMICAL HAZARD SURVEY OF ECE PROGRAM

(*to be conducted annually*)

Collect chemicals from various places in the ECE program, especially the rooms where children are present.

Name of Product	Manufacturer's Name and Telephone	Purpose of Product	Label Instructions ❑ Warnings read ❑ Child-safe (can be used around children)	MSDS ❑ On file ❑ Requested Date _____	Disposal ❑ Keep ❑ Stored properly ❑ Alternative needed (see reverse)

NOTE: In accordance with the Health Insurance Portability and Accountability Act (HIPPA) and applicable California laws, all personal and health information is private and must be protected.

California Childcare Health Program (CCHP) 04/05 www.ucsfchildcarehealth.org

CHEMICAL HAZARD SURVEY AND ACTION PLAN FOR ECE PROGRAMS

The federal Occupational Safety and Health Administration (OSHA) requires that employers inform staff about the presence of toxic substances including the presence of hazardous chemicals in the environment. The Illness and Injury Prevention Program must also include a safety and health survey that recommends: making a list of chemicals used in your workplace, obtaining a Materials Safety Data Sheet, and identifying where they are used. It is based on the premise that no employee should use chemicals without fully understanding their toxic properties and without the knowledge required to work with them safely. The survey and action plan provides a way to fulfill the requirement.

Complete the Child Care Chemical Hazards Survey and Action Plan according to the following directions:

1. Identify one lead person to conduct the survey for the facility, who will also be responsible for on-going communication in regards to chemical safety throughout the year. All staff can participate in collecting the chemicals they use to share with the lead person. This includes, kitchen staff, janitors, bus drivers, and administrative personnel.
2. Document the name of the product, the manufacturer's name, and their toll free 800 phone number from the label–used to contact for a Material Safety Data Sheet (MSDS) on the product. NOTE: If you cannot find the phone number consider discarding the product.
3. Describe the purpose for which the product is used in the child care facility. Are there several products used for the same purpose, e.g. cleaning? If so, consider narrowing the number of products to those that are the least hazardous, serve multipurpose functions, and are easy to purchase so the staff will always be familiar with their safe use.
4. Review the label for warnings about safe use especially around children, and for precautions to take while using the product. Record that the instructions and warnings have been reviewed and whether the product is child-safe. Eliminate products that seem too hazardous to use. If there are no label warnings consider discarding the product. If you have any questions about the warnings and/or instructions, contact the manufacturer for further information.
5. Indicate that a request for an MSDS sheet from the manufacturer has been made, if the product is determined acceptable and will be kept and used. Maintain a copy of the MSDS for every product being used on file at all times and also be available near the point of use.
6. Review the MSDS information to decide whether to1) keep the product, 2) dispose of safely, or 3) seek an alternative. Document which choices were selected.

The MSDS contains information about the product including ingredients, health hazards, proper safety gear and handling, and physical hazards such as flammability. Always store chemicals well away from food products and supplies. Examples of protective gear listed on a MSDS may include utility gloves, safety goggles, and a plastic apron, used when mixing a dilute chlorine bleach solution, commonly used and recommended as a sanitizer in child care programs. The following resources may help you make your child care program safer for staff and children.

by Judith Calder, RN, & Mardi Lucich, MA, 2004

- Cal/OSHA Consultation Service. 2002. Guide to Developing Your Workplace Injury and Illness Prevention Program, available online at: www.dir.ca.gov/dosh/dosh_publications/iipp.html.
- Less Toxic Alternatives to Hazardous Household Cleaning Products (CCHP Handout, 2004).
- Children's Environmental Health Network, online at: www.cehn.org.

LESS-TOXIC ALTERNATIVES TO COMMON HAZARDOUS HOUSEHOLD PRODUCTS

Common household products, even when used as directed, can be dangerous or hazardous. If words such as flammable, corrosive, reactive or toxic appear on the products' packaging, then looking for some safer and more earth-friendly choices is a good idea.

Try these non-toxic or less-toxic products as alternatives to common hazardous household products. While a little more "elbow grease" may have to be used with some of these products, the benefits in terms of improved indoor air quality, decreased exposure to chemicals, fewer waste disposal concerns, convenience, and lower costs should make the switch an easy one to make.

Air Fresheners/Deodorizers to inhibit mold and bacteria growth that can cause odors:

- Leave open boxes of baking soda in refrigerator, closets and bathrooms.
- Saturate cotton balls with pure vanilla; set out in dish in room.
- Pour white vinegar in dishes/bowls; set out in room.
- Simmer cinnamon and cloves in water on low heat.
- To clean garbage disposals, grind used lemons in the disposal or pour in baking soda.
- For carpets, mix 1-part borax to 2-parts cornmeal; sprinkle liberally on carpet and vacuum after an hour.
- Sprinkle baking soda or ½ cup borax in the bottom of garbage cans and diaper pails

Disinfectant means anything that will reduce the number of harmful bacteria on a surface. Practically no surface treatment will completely eliminate bacteria. Regular cleaning with soap and hot water is important. Or mix ½ cup borax into 1 gallon of hot water to disinfect and deodorize; do not rinse off borax mixture if you want to inhibit mold and mildew. Isopropyl alcohol is an excellent disinfectant, but use gloves and keep it away from children.

Cleaning Products

- **All-purpose cleaner** can be made from a white vinegar and salt mixture or from 4 tablespoons baking soda dissolved in 1 quart warm water.
- **Washing dishes** by hand, use ½ cup baking soda with a squeeze of lemon juice to create a mild dishwashing liquid to help cut grease and food.
- **Automatic dishwashers**, choose a detergent with the lowest phosphate count listed on the package.
- **Scouring powder** can be made from baking soda or dry table salt. Or try non-chlorinated Bon-Ami Cleaning Powder or Bon-Ami Polishing Cleaner (available in most supermarkets).
- **Floor cleaner and polish** can be as simple as a few drops of vinegar in the cleaning water to remove soap traces. For vinyl or linoleum, add a capful of baby oil to the water to preserve and polish. For wood floors, apply a thin coat of 1:1 oil and vinegar and rub in well. Painted wooden floors, mix 1 teaspoon washing soda into 1 gallon hot water. Brick and stone tiles, use 1 cup white vinegar in 1 gallon water and rinse with clear water.

- **Oven cleaners**: sprinkle salt on spills when they are warm, and then scrub. Mix 2 tablespoons liquid soap, 2 tablespoons borax, 1 quart of warm water; leave on oven surfaces for 20 minutes, then scrub with fine steel wool. Scrub pots with baking soda, salt and water paste.
- **Toilet bowl cleaner** can be made with a paste of borax and lemon juice. Clean frequently with a solution of ½ cup borax in 1 gallon water for cleaning and disinfecting. To remove lime deposits, pour full strength white vinegar in the bowl, let it sit for several hours, then scrub with sturdy brush.
- **Tub/tile cleaner** can be as easy as rubbing in baking soda with a damp sponge and rinsing, or wiping with white vinegar first, and following with baking soda as a scouring powder. Or try non-chlorinated scouring powder, such as Bon-Ami Cleaning Powder or Bon-Ami Polishing Cleaner (available in most supermarkets). For tub and sink stains, scrub with a paste made from cream of tartar and hydrogen peroxide. For grout, combine 3 cups of baking soda and 1 cup warm water, and scrub into grout; rinse well with water. For soap film on fiberglass surfaces, apply baking soda with a damp cloth, rub and rinse off residue. For shower-door tracks, pour full strength white vinegar into the track, let it soak for 10 minutes, and rinse.
- **Window/glass cleaner**: to avoid streaks, don't wash windows when the sun is shining. Combine a quart of water with ¼ to ½ cup of white vinegar, 1-2 tablespoons of lemon juice; or combine juice from 1 lemon, 2 cups of water or club soda, 1 teaspoon cornstarch. Spray on surfaces and wipe clean with lint-free cloth or newspaper, unless you are sensitive to the inks in newsprint. Dip glassware and crystal into water mixed with a splash of vinegar and dry with a lint-free cloth.
- **Metal cleaners/polishes** are different for each metal. Clean aluminum with a solution of cream of tartar and water. Brass may be polished with a soft cloth dipped in lemon-and-baking-soda solution, or vinegar-and-salt solution. Polish chrome with baby oil, vinegar, or aluminum foil shiny slide out. Clean tarnished copper by boiling the article in a pot of water with 1 tablespoon salt and 1 cup white vinegar, or try differing mixtures of salt, vinegar, baking soda, lemon juice, and cream of tartar. Clean gold with toothpaste; pewter with a paste of salt, vinegar, and flour. Silver can be polished by boiling it in a pan lined with aluminum foil and filled with water to which a teaspoon each of baking soda and salt have been added. Stainless steel can be cleaned with undiluted white vinegar.
- **Upholstery, rug and carpet cleaners**: clean spills immediately with club soda. Mix 1 quart water, 1 teaspoon mild liquid soap, 1 teaspoon borax, and a squeeze of lemon juice or a splash of white vinegar; apply with a damp cloth or sponge and rub gently; wipe with a clean cloth and allow to dry.
- **Drain openers**: pouring ¼ cup of salt down the drain followed by boiling water once a week can help keep drains from getting blocked. To unclog a drain, pour ½ cup of baking soda down the drain, followed by ½ cup of white vinegar. Let it sit for a few minutes, then pour 2 liters of boiling water down the drain to flush.
- **Mold/mildew –use a mixture of equal parts white vinegar and salt.**

Laundry Products

An effective alternative to using detergents is to return to soap. Soap is an effective cleaner for natural fabrics, leaving such items as diapers softer than detergent can. For cotton and linen, use soap to soften water. A cup of vinegar added to the wash can help keep colors bright (but DO NOT use vinegar if you are using bleach—the resulting fumes are hazardous). Silks and wools may be hand washed with mild soap or a protein shampoo, down

or feathers with mild soap or baking soda. For synthetic fabrics or blends (including most no-iron fabrics), there are biodegradable detergents on the market that do not contain phosphates, fragrances, or harsh chemicals.

- Adding ¼ to ½ cup of baking soda or vinegar during final rinse will leave clothes soft and fresh smelling.
- Use ½ cup borax (instead of bleach) per load to whiten and brighten colors and to remove spots.

Spot and stain remover: pour club soda on fresh spots and stains.

For chocolate, coffee, mildew, mud, and urine: dissolve ¼ cup borax into 2 cups cold water; sponge on and let sit until dry, then wash with soap and water to completely remove.

For bloodstains: (1) Immediately clean stain with club soda or sponge with cold water; dry with towel and repeat if needed. (2) Rub with cornstarch or cornmeal and water paste; let dry in sun; brush off. (3) If stain persists, then pour hydrogen peroxide directly on stain; rinse with water and wash as usual or apply mixture of ¼ cup borax and 2 cups cold water, rinse and wash.

For grease: (1) Apply paste of cornstarch and water; let dry then brush off. (2) Cover with baking soda or cornmeal; let dry and brush off.

For ink, mix with cold water, 1 tablespoon cream of tarter and 1 tablespoon of lemon juice; rub into stain for about a minute, then brush off powder with a clean brush, and sponge immediately with warm water; repeat if needed.

For rust, moisten spot with lemon juice, sprinkle with salt and expose to sunlight. For rust stains on whites, cover the stains with cream of tarter, gather up the article so that powder stays on the spot, submerge the whole thing in hot water for 5 minutes, then wash as usual.

Spray starch

- For regular fabrics, dissolve 2 tablespoons cornstarch in a pint of cold water; store in spray bottle and shake well before using.
- For delicate fabrics, dissolve packaged unflavored gelatin in 2 cups hot water; store in spray bottle and shake well before using. To test solution: tip corner of fabric in solution; if fabric becomes very sticky when dry, add more water.

Environmentally Responsible Products

The following are a sampling of websites available, and not an endorsement by the California Childcare Health Program.

EcoMall
www.ecomall.com

Earth Friendly Products
www.ecos.com

Cleaning Pro
www.cleaningpro.com

Seventh Generation
www.seventhgeneration.com

Health & Safety Notes
California Childcare Health Program

Anemia, Lead Poisoning and Child Care

Childhood Lead Poisoning

Lead poisoning is the most common environmental disease affecting children in our country today. While some lead naturally occurs in the earth's soil, our bodies have no use for it: in fact, it is toxic in any amount in our bodies. We have released lead into our environment by adding it to gasoline, paint, pottery and some industrial processes. Homes and buildings built before 1978 will almost certainly contain some lead-based paint.

Lead poisoning can cause serious health problems for children. It can slow their growth, cause learning disabilities and behavioral problems, and damage major organs such as the kidneys and brain.

Children between the ages of one and six years are most at risk for lead poisoning. Because young children often put their hands and toys in their mouths, they can swallow lead that gets on their hands and toys from dust, dirt and chipping paint.

Lead-based paint is not the only source of lead inside homes and child care programs. Lead can also be found in common household items such as pottery, home medical remedies, cosmetics, imported food products and candies, cans with lead-soldered seams, toys, mini-blinds and other products made of vinyl.

Children at risk for lead poisoning should have a blood lead test. This is the only way to find out if a child has lead poisoning. We don't really know how many children are lead poisoned because so few children are tested. However, all insurance plans pay for the test.

Parents can ask their child's medical provider to perform a lead test.

Child care providers can test their program for paint and products containing lead.

Source: *Childhood Lead Poisoning Prevention Branch, California Department of Health Services*

Lead poisoning can cause anemia.

Anemia makes it easier for lead to get into the blood.

Lead poisoning and anemia are both detected by a blood test.

Lead poisoning and anemia are both preventable.

Practice good nutrition and proper handwashing to help prevent lead poisoning and iron deficiency anemia.

Iron Deficiency Anemia

We need iron to keep our blood strong. Low levels of iron in a child's blood can make the child pale, tired, cranky, eat poorly, get sick more easily, get more infections, and have trouble learning.

Iron is a mineral found in some foods. Eating foods that are high in iron can help keep children healthy and feeling well.

Dairy products like milk, cheese, yogurt and ice cream are very low in iron. They are good for bones and teeth because they have a lot of calcium, but drinking too much milk can contribute to anemia. The milk fills the child up and he or she doesn't eat enough food high in iron. Babies should be weaned from the bottle by about 1 year of age. At this age, they should drink only 2 to 3 cups of milk per day (16 -24 oz).

Infants and children should have their blood tested for iron-deficiency anemia. Anemia can be prevented and mild cases can be reversed by eating diets high in iron.

Vitamin C helps the body use iron, so combine foods high in iron and vitamin C in meals and snacks.

Some foods high in iron

Beef, pork, liver, fish cooked beans, tofu, iron-fortified cereals, enriched tortillas and breads, leafy greens, dried fruit and prune juice.

Some foods high in vitamin C

Broccoli, cabbage, cauliflower, tomatoes, potatoes, bell peppers, oranges, melon and strawberries.

Serve children foods high in iron and vitamin C, and cook in iron pots.

Source: *WIC Supplemental Nutrition Branch, California Department of Health Services*

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Health & Safety Notes
California Childcare Health Program

Pets in the Child Care Setting

Many child care providers who care for children in their homes have pets, and many centers include pets as part of their educational program. Pets can be excellent companions. They meet the emotional needs of children and adults for love and affection. Caring for pets also gives children an opportunity to learn how to be gentle and responsible for others. Contact with pets can be fun and teach children about life, death and unconditional love. However, child care providers need to know about potential health and safety risks before making the decision to keep pets in child care.

What are the health and safety risks?

Allergies: Many children are allergic to animals and may have symptoms when they are around them. About 25 percent of allergic people are sensitive to dogs or cats, and cats generally cause more allergy problems than dogs. A child who is allergic to dogs or cats may also be sensitive to other common pets such as rabbits, guinea pigs or hamsters.

Injuries: Dog and cat bites are the most reported types of injuries caused by pets. The tearing and puncture wounds they produce can also cause infections.

Infections: Certain animals carry viruses, bacteria and other potential infections that can be passed on to people. Diseases that can be transmitted from animals to people are called zoonotic diseases. Zoonotic diseases can spread through direct contact with infected animals or their stool, insects that bite or live on animals, and infections that live in the environment where the animal lives.

What are some diseases we can catch from animals?

Salmonellosis: This disease is caused by salmonella bacteria and transmitted to humans by eating food contaminated with the feces of an infected pet. Many animals, such as chickens, iguanas, geckos and turtles are carriers of salmonella, but do not appear ill themselves.

Rabies is usually a viral infection of wild animals such as raccoons, skunks, bats and foxes, but can spread to domestic animals and humans by a bite or scratch.

Diarrhea can be caused by Campylobacter and parasites such as giardia, and is associated with infected dogs, cats, birds and farm animals.

Cat-scratch disease causes fever and swollen glands, and is usually transmitted by kittens.

Ringworm is a fungal skin infection which can be spread from dogs, cats, rabbits and guinea pigs.

Toxoplasmosis can affect anyone, but is very dangerous to unborn babies, causing birth defects. Humans catch this illness through contact with cat waste.

Psittacosis, an illness like pneumonia, can be transmitted by infected parrots and other exotic birds.

Who is at higher risk?

Pregnant women, infants, the elderly and people with weak immune systems such as those born with inherited immune deficiencies, AIDS/HIV and those receiving chemotherapy, are at higher risk of catching zoonotic diseases.

Which animals are not appropriate?

Some pets, particularly exotic pets such as iguanas, turtles, snakes, spiders and tropical fish may not be appropriate for the child care setting. Aggressive dogs especially hybrid wolf-dogs that have become increasingly popular in recent years, are potentially dangerous to humans, including their owners. Check with a veterinarian if you are unsure whether a particular pet is appropriate for children, and check with the local health department for regulations and advice regarding pets in child care. Venomous or poisonous animals are not appropriate for young children to handle under any circumstances.

What can you do to protect the health and safety of children?

To minimize the health and safety risks associated with pets, child care providers can take the following steps:

Reduce the risk of allergy problems

- If your child care setting has a pet, tell parents before they enroll a child, in case allergies may require the parents to make other child care arrangements.
- Do not bring animals into rooms used by children whose asthma is triggered by animals.
- To control allergy risks, confine the pets to a limited area that you can clean easily. Keeping the animal clean and brushed helps, too.

Protect children from injury and bites

Children commonly treat animals as if they were humans. They may hug or hit them or expect them to behave like another child and cause an aggressive response. These expectations increase when they observe that adults give animals human-sounding names, treat animals like people and tell stories about animals that act like humans. To prevent injuries:

- Before bringing and introducing any animal, learn about the usual behavior of that type of animal and get to know the individual pet. Since children's behavior can threaten an animal, be sure you know how the animal behaves when frightened.
- Make sure that children are introduced to pets in a quiet, controlled setting.
- Teach children how to behave around pets. They need to learn not to feed or provoke the pet, and that removing the pet's food or disturbing a sleeping pet upsets them. Always keep their faces and fingers away from a pet's mouth, beak or claws.
- All pets, whether kept indoors or outside, must be in good health, show no evidence of disease, and be friendly toward children.
- Child care providers must be present when children play with animals. Be ready to remove a child immediately if an animal shows signs of distress or the child treats the animal inappropriately.
- Keep pet food and dishes out of children's reach.
- Do not let children pet an animal that is in a cage, pen or tied up. Children should not put their fingers through openings in a cage.
- Do not let children interact with a mother animal or her babies while she is with them.

Prevent infections

- Children and providers should wash their hands after contact with any animal, its belongings or cage.
- Dogs or cats should be appropriately immunized (check with the veterinarian) and be kept on flea, tick and worm control programs. Proof of immunizations should be kept in a safe place.
- Keep your pets clean. Dogs and cats use their tongues to clean themselves, so try to discourage pets from licking the children and vice versa.
- Keep pet living quarters clean; dispose of pet waste immediately. Litter boxes should never, ever be accessible to children. Keep children away from areas where animals urinate.
- Keep sandboxes covered when not in use to prevent pets from using them as litter boxes.
- Pregnant providers should avoid contact with cat feces; someone else should dispose of cat litter daily.
- Teach children to avoid wild animals when taking hikes, walks or field trips.

What should you do if an animal bites a child in your care?

- Remove the animal to a secure setting away from children.
- Notify parents at once.
- Get medical help immediately if the wound is large, deep or bleeding heavily.
- Use disposable gloves and wash the wound thoroughly with soap and water.
- Control bleeding, elevate the body part that was bitten, and apply a clean bandage.

References

Prevention of Infectious Disease, California Childcare Health Program, 2001.

Early Childhood Health Link, American Academy of Pediatrics.

Pets and Kids, Susan S. Aronson, MD.

The ABCs of Safe and Healthy Child Care, The Centers for Disease Control and Prevention (CDC).

By A. Rahman Zamani, MPH (September 19, 2001)

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Lead in Keys

The role of child care providers in preventing lead poisoning

Lead poisoning is the most common environmental disease of young children from birth to 6 years of age and it is preventable. As a child care provider, you are in an ideal position to protect children from lead poisoning and to educate parents about the issue. There are more than 800,000 children under 6 years of age in licensed child care in California. Parents look to you to help keep their children safe and healthy.

There are many simple steps that you and parents can take to ensure that the children in your care are safe from lead poisoning. The biggest source of lead exposure for children is from old chipping house paint. Keeping lead out of the home and child care environment is one of the most important things you can do to protect children. Making sure that children wash their hands frequently and get good nutrition are also important.

What are the symptoms of lead poisoning?

Unfortunately, symptoms of lead poisoning do not appear until the child is very sick. They include problems with learning and paying attention, and damage to the brain, nerves and kidney. Because most children with lead poisoning do not look or act sick at first, the only way to know for sure if a child has lead poisoning is for him or her to have a blood test. Parents and caregivers of children 6 months to 6 years of age should request information about lead poisoning and a blood test if appropriate at health care visits. All children in publicly supported programs such as CHDP, Medi-Cal and Healthy Families should be tested at 12 and 24 months Other children who live or spend time in housing built before 1978 that has chipping paint or has recently been remodeled should also be tested.

Why are young children more at risk for lead poisoning?

Children are at risk for lead poisoning for many reasons:

- They explore their environment by putting toys, hands and other objects in their mouths.
- They spend a lot of time on the floor where sources of lead are likely to be found. Through normal play, children come in contact with deteriorating paint, paint chips, keys, soil and dust, which may contain lead.
- Young children absorb more of the lead they eat because they have more rapid metabolisms.
- Young children's rapidly developing brains are more vulnerable to the toxic effects of lead. These toxic effects can cause behavioral changes and can limit their intellectual and physical development.

Lead exposure can also be harmful to the developing fetus, so pregnant women should protect themselves from exposure as well.

Lead in brass keys

A recent study identified a new potential source of lead: brass keys.[1] Most brass house and car keys contain lead, because brass is a soft metal and lead is used to strengthen the key so that it will not break or bend. Brass has a yellow color, but when it is used in a key it is often covered over by nickel or a nickel-plating, making it difficult to be certain whether a key is brass and therefore is likely to contain lead.

Not all keys have lead in them, but it is difficult to tell which keys do and do not contain lead just by looking at them. For this reason, children should never be given any keys to play with.

As a result of this study, key manufacturers agreed to reduce the amount of lead in brass keys to a level that would not be a problem for adults who are handling the keys in a normal way, such as driving their cars or opening doors. However, because children often put things in their mouths and because they are at risk for lead poisoning for the reasons listed above, it is recommended that **no keys should ever be given to children to play with.** The study showed that if there is lead in the keys, the children can get lead in their bodies by putting the keys in their mouths, or by putting their hands in their mouths after playing with the keys.

Other sources of lead

There are a number of other potential sources of lead in a child's environment. The more sources of lead children are exposed to, the higher their risk of being poisoned, so it is extremely important to minimize all possible exposures.

- **Lead-based house paint** is the most common source of childhood lead poisoning. Buildings constructed before 1950 are very likely to have high levels of lead in the paint. Those built between 1950 and 1978 are likely to have some lead in the paint. In 1978, the amount of lead in paint was limited by law, so buildings constructed after that are less likely to be a problem.
- **Lead gets in the soil** from leaded paint breaking down to dust or chips or from leaded gas emissions. Lead is no longer included in gasoline, but some remains in the soil from car exhaust in the air. Contaminated soil is also a very common source of childhood lead poisoning.
- **Lead can be brought home on work clothes** if household members work with lead. Some examples of these jobs include radiator repair, making or fixing batteries, soldering, and home remodeling.
- **Some home-made remedies and cosmetics** such as Azarcon, Greta, Pay-loo-ah and Kohl contain lead.
- **Hand-made pottery or dishes** sometimes contain lead; test them with a kit from the hardware store.
- **Some hobbies** require the use of lead, including making stained glass or fishing sinkers.

What can child care providers do to protect children from lead poisoning?

- Teach parents what you know about lead poisoning. Share this new information about lead in brass keys.
- Encourage children to wash their hands before eating, after toileting or playing outside, and before going to sleep to help keep lead from getting into their bodies.
- Make sure that children in your program are getting plenty of nutritious food. Good nutrition helps prevent lead that is ingested from being absorbed. Nutrients such as calcium and iron can help prevent absorption, and so does a full stomach.
- Request that children be assessed for lead poisoning as part of your pre-admission requirements.
- Post and distribute information about lead poisoning.
- Make sure your own facility does not expose children to lead by following the guidelines below.

How can I make sure there is no lead in my child care program?

Your facility may have lead in the paint or soil, or have toys or dishes with lead in them. Here are some ways to see if there is any lead in your child care environment:

- Have your facility's paint and soil tested for lead. You can get the names of inspectors by contacting your local county lead poisoning prevention program or the state program. You can also test painted surfaces yourself, with testing kits sold at hardware stores. Call the Lead Program of your local Health Department for instructions on how and where to do your own testing.
- Take precautions before painting, building or renovating in your facility. Lead paint must be carefully removed, and you should consider hiring a lead abatement contractor to do so. Do not sand, scrape or burn lead-based paint. Children, pregnant women and pets should not be present during renovation.
- Cover bare soil around your facility. You can plant shrubs or grass so that children are not playing directly on the dirt. If you use well-maintained, impact-absorbing surfaces under play equipment, they will protect children from lead in soil as well as from falls.
- Wash mouthed toys frequently. Test old or imported painted toys for lead; if they test positive, don't use them.
- Inspect your facility for peeling or flaking paint and test to see if it contains lead. Keep cribs, playpens and other play equipment away from the area.
- Clean and disinfect all play surfaces on a regular basis to remove not only dirt, debris and body fluids, but lead paint dust.

Reference

[1]*People v. Ilco Unican Corp.*, Case No. 305765 (Super. Ct. S.F.), Decl. of Jeffery M. Paull, Dr.P.H., September 8, 2000.

Resources

California Childcare Health Program at (800) 333-3212 or visit the Web site at www.childcarehealth.org

Call the lead poisoning prevention program of your local health department (look for Health Department in the local government listings of the phone book).

State of California Lead Poisoning Prevention Program at (510) 622 5000 or www.dhs.ca.gov/childlead.

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Health & Safety Notes
California Childcare Health Program

The Use of Insect Repellent by Child Care Programs

Insect repellents help reduce the exposure of children to insect bites, which can cause local allergic reactions and some diseases. Of particular concern are bites from mosquitoes and ticks. Mosquitoes can carry viruses and parasites that cause West Nile virus or other illnesses. Ticks can cause Lyme disease and other illnesses. These diseases can be serious but they are also rare. There has been an increase of reported cases of West Nile virus disease in California, and this is cause for concern. However, taking care to prevent exposure to the insects that carry these diseases is important, and preparation is better than panic when there is an outbreak.

What is the most effective insect repellent?

The most effective repellents contain the chemical DEET (chemical name N, N-diethyl-metatoluamide). DEET does not kill insects—it makes it harder for them to locate humans. None of the presently marketed non-DEET products offer the duration of protection of those containing DEET. Until more products become licensed by the EPA, wearing protective clothing, and using DEET on clothing and exposed areas of skin, offers the best protection.

Repellents with DEET are effective only at short distances, so you may still see mosquitoes or other insects flying nearby even when you have applied a repellent. As long as you are not getting bitten, there is no reason to apply more DEET.

Using insect repellents with DEET

Repellents are available with concentrations ranging from 10 percent to 30 percent DEET. The higher the concentration, the longer the product's effects will last. Use the concentration of DEET that is appropriate for the amount of time you will be exposed. Insect repellents containing DEET with a concentration of 10 percent appear to be as safe as products with concentration of 30 percent for adults, when used according to the directions on the product labels. Followed the directions on the label exactly.

DEET insect repellents should be used with caution on children 2 months to 12 years of age. DEET is not recommended for infants under 2 months old.

Use DEET sparingly on exposed skin only; do not apply under clothing. Do not use DEET on the hands of young children. Do not apply to hands, areas around the mouth, eyes, or on skin that is irritated or has open sores. Wash treated skin with soap and water after returning indoors; wash treated clothing. Avoid spraying in enclosed areas and do not use DEET around food.

Because repellents can cause a skin reaction, parents or guardians should apply repellent to children once or twice at home before it is used in child care to be sure the child is not sensitive or allergic to it, and provide written consent to apply insect repellents in child care. If there is a reaction, wash the affected skin and call the parent or guardian to seek medical advice.

For more information, see CCHP's related Health and Safety Notes *Summer Safety* and *West Nile Virus: What You Should Know.* Visit www.ucsfchildcarehealth.org or call the Healthline (1-800-333-3212) for copies.

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Parent/Guardian Permission to Apply Insect Repellent to Child

Name of Child: _____

As a parent, I recognize that insect bites to my child pose a risk of allergic reactions and disease.

Therefore, I give permission for the staff of _____ to apply
name of child care program

an insect repellent approved for use on children (name of product)_____

to my child under the following conditions:

1. When mosquitoes are present.
2. During field trips that may expose a child to ticks or mosquitoes.
3. Always used according to directions on the label.
4. Applied only to exposed skin and clothes.
5. Not applied to babies under 2 months.
6. Not applied near eyes or mouth or on hands.

DEET-based products offer the best protection against mosquitos. Use of the product may occasionally cause a skin reaction. If that happens, we will discontinue use of the product, wash affected skin and notify you so you can seek advice from your health care provider. It is best if you use this or a similar product on your child once or twice at home first to monitor for reactions.

I have checked and initialed below all applicable information regarding the child care program's choice in brand/type and use of insect repellent for my child:

❑ ___ Staff may use the program's insect repellent indicated above according to the directions on the product label.

❑ ___ I do not know of any allergies my child has to children's insect repellent.

❑ ___ My child is allergic to some insect repellents. Please use only the following brand(s)/type(s) of repellent: _____, according to the directions on the label.

❑ ___ I have provided the following brand/type of insect repellent for use on my child:
_____

❑ ___ For medical or personal reasons, please DO NOT apply insect repellent to the following areas of my child's body:
_____

❑ ___ **Please do not apply insect repellent to my child.**

Parent/Guardian's Name: _____ Date: _____

Parent/Guardian's Signature: _____

Health Provider's Signature (optional): _____

CALIFORNIA CHILDCARE HEALTH PROGRAM

Health & Safety Notes

Indoor Air Quality

CHILDCARE HEALTHLINE

When we think of air pollution, it is important to consider the air that is inside of our homes, workplaces, and other buildings. The Environmental Protection Agency has found that indoor air is two to five times more polluted than outdoor air, and considers contaminants in indoor air among the top five environmental risks to public health. Indoor air contaminants may have adverse effects on the health and comfort of infants, toddlers, preschoolers and the staff who care for them. Many health problems can be triggered by polluted air.

Young children and indoor air pollution

Young children are especially vulnerable to indoor air pollution. The same concentrations of pollutants can result in higher exposures to children because they breathe more air in proportion to their body weight than adults. Also, since children are growing and developing, the potential for damage to their respiratory and neurological systems is greater.

What are the health risks?

Some short-term health problems that may result from indoor air pollutants are headache, nausea, dizziness, infection and irritation of the eyes, nose and respiratory tract. Possible chronic and long-term effects include asthma, allergies, lung disease, cancer, and neurological damage.

What causes indoor air pollution?

- biological contaminants such as mold, dust mites, pet dander and cat saliva, pollen, rats and mice, cockroaches, bacteria and viruses
- gas stoves, wood stoves and kerosene heaters
- solvents, cleaning agents, air fresheners, cosmetics and perfumes
- dust from lead paint
- off-gassing of chemicals found in furnishings and consumer products such as carpeting and upholstery, wood finishes, rug and oven cleaners, paints and lacquers
- art supplies such as glues, paints, dry erase markers and pens
- pesticides
- radon
- tobacco smoke and second-hand smoke

How can we reduce indoor air pollution?

Remove the source of the pollutant. Source control is the most effective, economical and time-efficient way to address indoor air quality.

Control moisture in the environment. Moist vapor, standing water and water-damaged materials are a breeding ground for mold, mildew, insects and bacteria. Prompt attention to moisture problems is essential to reduce the risk of adding contaminants into the air.

Provide ventilation. Ventilation means supplying outdoor air to the areas that are occupied by children indoors. Opening windows and safely using fans will provide ventilation. Windows should open no more than four inches and fans should not be accessible to children. When windows cannot be opened, rooms should be ventilated by a system that circulates air from outdoors. State laws set standards for the amount of fresh air that should enter the building during operation of the heating, ventilation, and air conditioning systems (HVAC). HVAC systems should be inspected to ensure that the vents that allow mixing of outdoor air are open. Failure to open the vents is common and results in unsafe indoor environments.

Maintain and inspect heating and air conditioning systems. Never burn charcoal indoors. Fireplaces, furnaces, gas heaters, air conditioners and ventilation systems need to be clean, dry and in good

repair. Filters should be changed regularly. Make sure that vents in HVAC systems are open.

Review custodial and housekeeping practices. Vacuum and damp mop for dust which may contain lead, dust mites, pesticides and other contaminants. Use proper dilutions for cleaning products and use products only for their intended purpose. Read labels and buy the least harmful product available. Products labeled "warning" or "caution" are less harmful than those labeled "poison" or "danger." Choose cleaning products with fewer fumes such as baking soda and vinegar. Avoid products in aerosol sprays. Don't use air fresheners—they do not improve air quality and use artificial chemicals.

Equip craft areas properly. Use art supplies such as glues and paints outside or in ventilated areas. Do not use materials that create toxic fumes or gases. Read the labels, as they are required to identify hazardous ingredients. Don't store open, unused paints and craft materials. Supervise children closely.

Use pesticides only as a last resort. Use Integrated Pest Management (IPM) rather than spraying pesticides (for more information see *Health and Safety Note: Keeping Children Safe from Pests and Pesticides*). Consult a specialist who is familiar with IPM.

What are useful policies for promoting indoor air quality?

Written policies show you are committed to providing a healthy child care setting and help avoid confusion when communicating with parents and staff. Communication about environmental issues is essential between caregivers, parents, grounds keepers, custodial staff and maintenance contractors. Policies may address:

- **Painting, renovations and repair.** Schedule these activities for times when children are not present. Test all painted surfaces for lead before painting. Choose licensed professionals with experience in dealing with lead paint and proper disposal of debris. Volunteers, although well meaning, are often not aware of the environmental risks to young children.
- **No smoking.** This includes all adults. Adults who live in the home of a family child care program as well as parents, relatives and staff should be aware of this policy.
- **Pest management.** Use IPM techniques.
- **Ventilation.** Arrange your space to provide adequate ventilation to high-need areas such as arts and crafts areas and diaper changing areas. Install window guards for safety. Regularly inspect and maintain HVAC systems.
- **School supplies and purchasing choices.** Purchase least toxic supplies. Install new products such as carpeting and furniture when children are not present, and provide ventilation for 48 to 72 hours after installation. (AAP, 2003) Choose low emission products.
- **Sanitizing and cleaning products.** Decide what products you will use for cleaning and sanitizing. Keep products in their original containers. Keep all chemicals out of the reach of children.
- **Pets.** Determine if you will allow pets in your program. Confine pets to a limited area that is easily cleaned.

Are air purifiers helpful?

Many products are sold as air purifiers. Ozone generators purposely introduce ozone into the air. Ion generators may introduce ozone into the air as a byproduct. Ozone can be harmful to children, so these devices are not recommended. Air filtration systems, if properly maintained, can be used as an adjunct to source control and adequate ventilation. Effective control at the source of pollution remains the most important step in maintaining air quality. (AAP, 2003)

Resources and References

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CALIFORNIA CHILDCARE HEALTH PROGRAM

Health & Safety Notes

Keeping Children Safe from Pests and Pesticides

CHILDCARE HEALTHLINE

California State Licensing regulations for child care state that child care settings should take measures to be free from rats and insects. The national standards in *Caring for our Children* tell us that the potential health hazards to children caused by the presence of pests should be reduced. What does this mean to the child care provider? Since pesticides can also pose a health threat to young children, finding ways to reduce or eliminate exposure to pests while reducing or eliminating exposure to pesticides is an environmental concern that every early care and education professional needs to address.

Why control pests in child care?

Diseases that are spread by insects and rodents can be passed to young children. Normal behaviors in young children such as crawling, mouthing toys and other objects along with natural curiosity and exploration make toddlers particularly vulnerable to diseases carried by pests. Common pest-related hazards in child care settings include:

- Flies and cockroaches may spread disease.
- Mosquitoes may carry disease.
- Cockroaches can cause allergies and asthma attacks.
- Yellow jacket stings are painful and can be life threatening to those with allergies.
- Spiders may inflict painful bites and some may pose a health risk.
- Mice and rats may contaminate food, trigger asthma attacks, carry disease and cause structural damage to buildings, pipes and electrical wiring.
- Termites cause structural damage to buildings and wood furniture.

Why are children vulnerable to pesticide exposure?

The behaviors that make young children vulnerable to diseases carried by pests (crawling, mouthing toys, etc.) can also expose children to the pesticides that have been applied to control pests. Pound for pound, children eat, drink and breathe more than adults. Thus, if pesticides are in their environment, they can have higher exposures than adults. Combined with the fact that their brains, immune systems and organs are immature and still developing, children can suffer both short-term and long-term health problems from pesticide exposure.

What health risks are associated with pesticide use?

With the exception of poison baits, as little as 1 percent of pesticides applied indoors reach the targeted pest (AAP, 2003). As a result, pesticide residues are left on surfaces and in the air of the treated building. Outdoor application of pesticides may fall on non-targeted organisms, outdoor furniture and play areas and be tracked indoors. Acute symptoms such as nausea, headache, dizziness and respiratory irritation may occur from exposure to pesticides. Studies have shown that children who are exposed to pesticides also have a higher incidence of chronic health problems such as neurological disorders, leukemia and other cancers and have a greater risk of developing asthma (IPM Institute, 2004).

Integrated Pest Management

Integrated Pest Management (IPM) is a pest control program that minimizes pesticide exposure. Despite the convenience and availability of pesticides, there are many ways to control pests without the use of chemicals. IPM controls pests by combining biological, mechanical, cultural, physical and chemical methods in a way that minimizes health and environmental risks. IPM provides the least toxic alternative. It is based on inspection and knowledge of the pests' biology and habits to determine the methods that would best control the pests with the lowest possible exposure to pesticides. Chemicals

are only used as a last resort. IPM is endorsed and promoted by the Environmental Protection Agency.

Why are education and communication important?

The common sense strategies of IPM require the combined efforts of teachers, kitchen staff, parents, custodians and groundskeepers. Education and communication are essential to promote the necessary changes in habits and attitudes. A licensed IPM professional can suggest the best strategies for controlling pests in your child care setting.

Cultural controls and sanitation. Modify the activities in the child care facility to make the environment less hospitable to pests.

- Restrict food consumption to certain areas.
- Empty trash cans at the end of the day rather than letting them sit over night.
- Store food in containers with tightly fitting lids.
- Clean dishes, utensils, and surfaces soiled with food as soon as possible after use and at the end of each day.
- Clean garbage cans and dumpsters regularly.
- Collect and dispose of litter daily.

Physical controls. Use barriers or other materials to exclude pests from an area.

- Caulk cracks and openings.
- Fill in access holes in walls.
- Seal around electrical outlets.
- Use trash cans with tightly fitting lids.
- Empty and thoroughly clean cubbies and storage areas at least twice a year.
- Reduce clutter in which pests can hide.
- Keep vegetation, shrubs and wood mulch at least one foot away from structures.
- Keep window and door screens in good repair.
- Use physical traps. Be aware that in the child care setting, traps can be a hazard and must be placed out of reach of children. This includes sticky traps, snap traps and fly traps.

Biological controls. Identify the problem or pest before taking action.

- Look for the root of the problem, not just the symptoms of a pest problem.
- Inspect and monitor pest populations.
- It is very important to reduce pests' access to food, water and shelter.

Chemical controls. As a last resort, the careful use of pesticides may be necessary.

- Always use a licensed professional with experience in IPM when applying chemicals.
- Use bait, traps or gels in cracks, wall voids, and in spots that are out of reach of children. Avoid sprays, powders and "bomb" applicators.
- Schedule pesticide application for times when the building and grounds are not occupied.
- Use spot treatments as needed, rather than area-wide applications or regularly scheduled applications.
- Store all chemicals in a locked cabinet.

Attitude Adjustment

Increase your tolerance for pests that are just a nuisance and don't spread disease. To control these pests, always make use of non-chemical strategies first. Pests that do not pose immediate health threats but are a nuisance include:

- **Weeds** may invade playing fields or playgrounds or be aesthetically unpleasing. Pull by hand.
- **Ants** may gather in eating and play areas. Keep areas clean. Use non-toxic alternatives.
- **Fruit flies** may appear in kitchens. Keep food and garbage covered.
- **Meal moths** may infest food storage. Dispose of infested food. Store food in containers with tightly fitting lids.
- **Head lice** may appear on children. Have parents consult their health care provider for treatment.

References and Resources

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Health & Safety Notes
California Childcare Health Program

Recommendations for Cleaning, Sanitizing and Disinfecting

Illnesses may be spread in various ways, such as by coughing, sneezing, direct skin-to-skin contact, and by touching an object or surface with germs on it. Germs causing infection may be present in human waste (urine, stool) and body fluids (saliva, nasal discharge, drainage from lesions or injuries, eye discharge, vomit and blood).

Infected persons may carry communicable diseases without having symptoms, and they may be contagious before they experience symptoms. Child care staff need to protect themselves and the children by routinely cleaning and disinfecting exposed areas. Gloves should be worn when cleaning up blood, and hands should be washed any time body fluids are touched. Since children will touch any surface they can reach, all surfaces may be contaminated. Therefore, all surfaces must be properly cleaned and sanitized.

Do not mix household bleach with other household chemicals such as toilet cleaners, rust removers, acids or products containing ammonia. Mixing these chemicals with bleach will produce harmful gases.

Cleaning

Prior to using a bleach solution to sanitize, remove dirt and debris such as blood, urine, vomit, stool, food, dust or fingerprints by scrubbing and washing with detergent and rinsing well with water.

Routine cleaning with an all-purpose liquid detergent or abrasive cleanser gets rid of the dirt you can see. Scrubbing physically reduces the number of germs on surfaces (as when we wash our hands). Use a disposable cloth or one that can be washed after each use, so that you don't move germs from one place to another. Sponges are not recommended as they harbor bacteria and are difficult to clean. Some items and surfaces should receive an additional step, *disinfection*, to kill germs **after** cleaning with detergent and rinsing with clear water.

Carpeting should be vacuumed daily (when children are not present) and shampooed at least every three months. Carpets should be cleaned monthly in infant areas. Carpet cleaning must be done when children are not present to avoid fumes and allow the carpet to dry. Use a cleaning method approved by the local health authority.

Sanitizing or disinfecting

After cleaning, you can eliminate virtually all germs left on surfaces through the use of a chemical, such as a germicide or chlorine, or a physical agent such as heat.

In the child care setting, a solution of 1/4 cup household liquid chlorine bleach added to 1 gallon of cool tap water (or 1 tablespoon bleach to 1 quart of water) prepared fresh daily is an effective disinfectant. Disinfecting with bleach is NEVER effective unless the surface has been thoroughly cleaned first.

Apply disinfectant solution by spraying from a spray bottle, wiping with a cloth rinsed in disinfectant solution, or by dipping the object into

Area	Clean	Sanitize	Frequency
Countertops/tabletops, floors, doors and cabinet handles	X	X	Daily and when soiled
Food preparation and service surfaces	X	X	Before and after food activity; between prep of raw/cooked foods
Cribs and crib mattresses	X	X	Weekly, before use by a different child and when soiled or wet
Utensils, surfaces and toys that go into the mouth or have been in contact with saliva or other body fluids	X	X	After each child's use, or use disposable, one-time utensils or toys
Toilet bowls, seats and handles, door knobs, floors	X	X	Daily or immediately if soiled
Hand washing sinks, faucets, surrounding counters, soap dispensers, door knobs	X	X	Daily and when soiled
Changing tables, potty chairs (use of potty chairs in child care is discouraged because of high risk of contamination)	X	X	After each child's use

the solution. Allow object or surface to air dry for at least two minutes before wiping it and/or using it again.

Hand-washed dishes must **always** be cleaned and disinfected after each use using bleach water only. *Pacifiers and manipulatives* can go in the dishwasher in a mesh bag on the upper level and heat dried to be disinfected. Items that can go through the dishwasher or washing machine cycle are disinfected if the water is hot enough to kill the germs (160° F). *Washable cloth toys* and other items can be machine-washed and machine heat-dried.

Household bleach with water is recommended because it is effective, economical, convenient and readily available. However, to avoid fumes, corrosion and color loss on some surfaces, you may look for a commercial product which is a "quaternary ammonium" and dilute according to the label instructions. Some of the newer products have a detergent in them and can be used to clean and disinfect in one step **if** there is no gross contamination with food particles, meat juices, blood or dirt. If these are present, cleaning first is still required.

Good ventilation is always important, especially in enclosed areas (such as bathrooms) and where chemicals are stored. Chemical air fresheners may cause nausea or allergic responses in some children and should never be used.

Note: We urge our readers to obtain more comprehensive information on cleaning and disinfection from "Caring for Our Children" and from the CCHP *Prevention of Infectious Disease* Curriculum.

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NO SMOKING

California
child care regulations
prohibit smoking
when children are present

We don't allow smoking at any time

ENVIRONMENTAL CONCEPTS

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

Because of its potential to harm human health, concern for the relationship between the natural environment and human health has been a basis of public health practice since 1878. In contrast, general public awareness of and involvement in environmental issues has developed only in the last few decades. The publication of Rachel Carson's *Silent Spring* in 1962, and the well-publicized health problems of residents of Love Canal (a notorious hazardous waste site in western New York) in the late 1970s, awakened scientists, industrial leaders, politicians, government officials, and grassroots activists to environmental concerns. The *"environmental movement"* was set in motion, and introduced into everyday conversation were such terms as "water quality," "clean air," "ozone," "urban sprawl," and "agriculture runoff" (U.S. Department of Health and Human Services, 2000).

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 and 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 (Sattler et al., 2001).

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.

To facilitate review of this module, a glossary of environmental terms is presented on the next page.

From: National Training Institute for Child Care Health Consultants (2004)

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, target 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 is 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 are 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 bacterium, 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, and 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.

Phthalates (pronounced THAL-aytes): A family of chemical compounds incorporated into consumer products. About 80 percent of all the phthalates manufactured are used to make plastics flexible. Phthalates are a chemical of emerging health concern and public interest.

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 drain pipe 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 saleand 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.

g/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.

From: National Training Institute for Child Care Health Consultants (2004)

Adapted from:

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

U.S. Department of Health and Human Services (2000) Chapter 8, p 8-3.

U.S. Department of Housing and Urban Development, Office of Lead Hazard Control. Lead paint safety. Washington (DC): U.S. Department of Housing and Urban Development; 1999.

SUPPLEMENTARY MATERIALS ON ENVIRONMENTAL TOPICS OF SPECIAL INTEREST TO CHILD CARE PROVIDERS

Art Materials

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, 2003).
- 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, 2003].

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 makers and may try to eat them.

Where to Find More Information

University of Nebraska Cooperative Extension. (1994). Safety in children's arts and crafts projects. Lincoln (NB): University of Nebraska Cooperative Extension. Retrieved August 14, 2005, from http://www.ianr.unl.edu/pubs/safety/g1211.htm.

Cleaning Products

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.
- **Perform an annual chemical survey** of your home or ECE program.
- **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).

Noise

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 psy-

chological effects such annoyance, interference with activity and symptoms such as headaches, tiredness, and irritability (AAP, 2003).

- 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, 2003).

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 [2003].)

Sun Safety

Key Points

- While 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 light-skinned people need to be concerned about 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, 2002g).

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 mid-day 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, 2005). Create shade in outdoor play areas by planting trees or providing tents, awnings, or other simple shelter from the sun.
- **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, 2003 p. 381). 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 ECE program have a written policy for the use of any commonly used non-prescription 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, issued daily in selected U.S. cities, provides important information to help you plan your outdoor activities in ways that prevent overexposure to the sun.

Where to Find More Information

California Childcare Health Program. Health and safety note: smart fun in the sun. [online] 2004. http://www.ucsfchildcarehealth.org/webpages/pdftext/healthsafety/sunsafen081803.pdf

California Childcare Health Program. Sun smart policy and parent/guardian permission to apply sunscreen. [online] 2004. http://www.ucsfchildcarehealth.org/webpages/pdftext/Forms%20&%20Resources/Sunscreen-AppConsentEG2.pdf.

Centers for Disease Control and Prevention. When you're in the sun choose your cover. [online] 2001 [cited 2002 Aug 19]. http://www.cdc.gov/chooseyourcover.

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

Weather Watch

Key Points

- ECE providers need to be aware of weather extremes and the risks to children. Heat and cold-related injuries are serious problems for children resulting in death, heatstroke, heat exhaustion, frostbite and hypothermia.
- ECE providers also need to be aware of air quality and "Spare the Air" days when air pollution is high. It is recommended that children limit the amount of time spent being active outdoors on days with excessive air pollution.
- 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** such as running through a sprinkler when temperatures are high. Provide an air-conditioned environment when the heat index, both humidity and temperature, is high.
- **Keep 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, wear 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).

Where to Find More Information

Iowa Department of Public Health, Healthy Child Care Iowa. Child care weather watch -wind chill and heat index charts and recommendations. [online] 2004. http://www.idph.state.ia.us/hcci/products/weatherwatch.pdf.

From: National Training Institute for Child Care Health Consultants (2004)

CHILD CARE INVENTORY FOR AIR POLLUTION HAZARDS

Potential Hazard	Relevant air pollutant	Recommended Actions for Prevention/ Management of Air Pollution Exposure	By Whom
Location of facility	Ozone (smog), lead, sulfur compounds, nitrogen oxides, nitrogen dioxide in ambient air	Keep track of ambient air quality in the community. On bad air days, • restrict the amount of time children spend outside, especially if lots of physical activity is involved; and • reschedule outdoor physical activity to the early morning when ozone levels are lower.	Provider Provider
Location of facility	Radon	Radon is present in most soil and rock, particularly in mountainous areas. Contact the radon office in your state environmental health department for maps of radon prone areas in your state. When trapped in buildings radon can reach elevated levels. Also, radon levels can also vary significantly from house to house. Every ECE facility should be tested to insure that air is free of radon in excess of 4 picocuries per liter of air.5[5.005, 5.007, 5.103] "Do-it-yourself" radon test kits are readily available from hardware and home improvement stores or through mail order companies for a cost of approximately $15-$25. The cost usually includes fees for lab analysis and mailing. For more information on radon testing and radon educational programs, get in touch with your state radon contact at www.epa.gov/iaq/contacts.html.	Provider
Location of facility	Carbon monoxide, nitrogen dioxide, smoke, soot, dust from nearby highways, factories, or plants.	Provide outdoor play in areas away from emissions from any nearby industrial sites.[5.169] Plan outdoor activities for areas away from traffic.	Provider Provider
Home furnishings (pressed wood furniture, paneling, carpets, drapes)	Formaldehyde	Purchase furnishings that are laminated or coated. Completely seal or coat raw pressed wood or particle board furnishings with a paint, varnish or vinyl material that does not contain formaldehyde. Wash durable press fabrics before use.	Provider Provider Provider

Potential Hazard	Relevant air pollutant	Recommended Actions for Prevention/ Management of Air Pollution Exposure	By Whom
Age of facility	Asbestos	Older buildings commonly contain asbestos (a fire resistant material) in ceiling or floor tiles, pipe or furnace insulation and on other surfaces. Over time, it can deteriorate and flake into fine dust. If the ECE facility is housed in an older building, the building should be evaluated by a certified professional for the presence and condition of any asbestos.	Professional
		If asbestos is damaged or deteriorating, it should be removed by a certified professional.	Professional
		Any areas of undamaged asbestos should be clearly identified and enclosed so that they are not exposed or disturbed, especially during any remodeling activities.[5.104]	Professional/ Provider
		If the facility contains any undamaged asbestos, it should be periodically inspected by a certified professional for damage or deterioration.	Professional
Construction materials (pressed wood subflooring, paneling)	Formaldehyde	Purchase pressed wood products for construction or remodeling that specify lower formaldehyde emission levels.	Provider
		Avoid urea-formaldehyde foam insulation.	Provider
		Use wood paneling that does not contain formaldehyde.	Provider
		Install exhaust fans in bathrooms and kitchens.[5.027, 5.028]	Provider
		Generally, mobile homes contain a higher percentage of pressed wood products than permanent structures (see page 28). In these types of facilities, insure adequate ventilation by keeping doors and windows open between rooms and to the outside.[5.042 5.027]	Provider
Fuel-burning appliances/ heating sources		All appliances used for heating that are in vicinity of children must have protective screening.[5.037]	Provider
		Fireplaces and fireplace inserts must be inaccessible to children. If the fireplace is used, adults must be in the room within easy reach of the children.[5.038]	Provider

Potential Hazard	Relevant air pollutant	Recommended Actions for Prevention/ Management of Air Pollution Exposure	By Whom
Cleaning products	Volatile organic compounds	Monitor use of household chemicals. In deciding between two products that produce the same cleaning results, choose the least toxic. Check ingredients on the label, or obtain a Material Safety Data Sheet (MSDS) from the product company.[5.102] Under "Health Hazard Rating," (with a scale from 0 to 4), choose the lowest number.	Provider
		Do not use products containing volatile organic compounds in the presence of food or children.	Provider
		Read and follow directions for use on product labels. Do not mix any cleaning products unless directed on the product label. When instructions state, "use with adequate ventilation", the best strategy is to use the product outside the building. If the product is used inside the building, increase ventilation during and after use by opening windows and using exhaust fans.[5.100]	Provider
		Limit or do not use high solvent cleaners when cleaning the carpet.	Provider
		Store chemicals properly in an area not normally occupied by people, such as a garage or shed, and safely out of reach of children.[5.011, 5.100] Buy only the amount you need and store in original container so that safety information is not lost.	Provider
Art materials	Volatile organic compounds	Make sure art materials meet ASTM standards.[3.038]	Provider
		After using arts and crafts materials clean area thoroughly by damp mopping.	Provider
		Insure appropriate ventilation when using art materials.[5.029]	Provider
		Do not use art materials containing toxic fumes or gases.[5.029]	Provider
		Children should not eat or drink while engaged in art projects.	Provider
		Children should wash their hands thoroughly when finished with art work.	Provider

Potential Hazard	Relevant air pollutant	Recommended Actions for Prevention/ Management of Air Pollution Exposure	By Whom
Cleanliness of facility	Dust, soot, asbestos, animal dander, dust mites	Keep the ECE facility clean. On hard surfaces, use damp mops/dust rags instead of dry dusting or sweeping.	Provider
		Limit the use of carpeting. It provides an easy site for biological contaminants to collect and grow. If some soft surfacing is desired, replace carpeting with small, washable area rugs.	Provider
		Vacuum carpeting daily. When vacuuming, use a HEPA filter. (For cleaning carpets, see recommendations for Cleaning Products and Humidity.)	Provider
		Restrict pets (dogs, cats, etc.) from carpeted and sleeping areas of the facility.	Provider
		Launder blankets and bedding materials in sleeping area at least monthly.[3.028]	Provider
		Consider having children, staff, and visitors leave shoes by the entry door.	Provider
		Regularly clean the drip pan under the refrigerator.	Provider
		Vent clothes dryers to the outside.	Provider
		Keep air filters clean.[5.031]	Provider
		Schedule cleaning when children are not present.	Provider
		Use cleaning products according to instructions.	Provider
ECE staff, parents, and visitors	Environmental tobacco smoke, dust, soot	Maintain a tobacco smoke-free environment.[3.041, 8.038]	Provider
		Inform staff and parents regarding presence of any potentially hazardous substances in facility, e.g., encapsulated or enclosed asbestos, formaldehyde, or other hazardous chemicals.[5.102]	Provider

Potential Hazard	Relevant air pollutant	Recommended Actions for Prevention/ Management of Air Pollution Exposure	By Whom
Humidity	Mold, mildew, formaldehyde	Increase ventilation.[5.042] Open windows and doors to provide fresh air from the outside.	Provider
		If an air filtering system is installed make sure it is properly maintained.	Professional
		When wet cleaning carpeting, do not saturate it. Use a hot water extractor to reduce the amount of water remaining in the carpeting. Use fans and a dehumidifier in the carpeted room in order to dry it within 24 hours.[3.026, 3.028, 3.034, 5.079, 5.108-5.109]	Provider
		Vent the clothes dryer to the outside of the house.	Provider
		Install exhaust fans in bathrooms and kitchens.[5.027, 5.028, 5.031]	Provider
		Limit the use of humidifiers. If humidifiers are used occasionally, maintain and clean them regularly and frequently.	Provider
		Use a dehumidifier in high moisture areas such as basements.	Provider
		Do not use carpeting directly on cement floors or in damp areas like the basement.	Provider
		Promptly repair roof, pipe, and basement leaks.	Provider
		Discard water damaged porous items (sheetrock, paneling, carpets, furniture, etc.) especially if repeatedly dampened or wet for more than 24 hours.	Provider
		Keep facility warm enough (65°-75°) to prevent moisture buildup or condensation (and mold growth), especially in poorly insulated areas. Properly insulate and correctly install a vapor barrier in wall and ceiling areas. Year round, try to keep the indoor relative humidity below 50 percent.[5.028, 5.029, 5.041]	Provider

From National Training Institute for Child Care Health Consultants, 2004

CHILD CARE INVENTORY FOR WATER POLLUTION HAZARDS

Potential Hazard	Recommended Actions for Prevention/Management of Water Pollution Exposure	By Whom
Public water supply	If using water from a public water supplier, read your Consumer Confidence Report to learn whether your water system meets all drinking water standards.[5.055] This report is available from your water supplier, and is also available online at: www.epa.gov/safewater/dwinfo.htm.	Provider
Well water	If using water from a private well, have it tested regularly to meet federal, state and local standards. Contact your health department for more information on testing private well water.[5.055] Consider using a water filter certified by an independent, nonprofit, health and safety product certifier, such as NSF International. Contact NSF at www.nsf.org or call 1-800-NSF-MARK. To be effective, filters must be maintained according to the manufacturer's directions.	Certified Professional Provider
Water piping and joint seals	If interior or service piping or joint seals contain lead, have your drinking water (private and public) tested for lead. Contact your health department and ECE office for more information.[5.061] Make sure water and plumbing systems meet state and local regulations for buildings.[5.055-5.058]	Provider Provider/CCHC
Water storage for emergencies	Have a safe water supply available for emergencies.[5.063]	Provider
Diet	Check with your state health, environmental, and conservation departments regarding any fish advisories related to water pollutants such as PCBs or mercury in fish in your area.	Provider
Recycling/ waste disposal	Help protect your drinking water sources: • Take used motor oil to a recycling center. If you let it drain into a storm sewer or bury it in the trash, it can leak into lakes, rivers and wells. Just one pint of used motor oil can expand over great distances and cause adverse effects to human health and the environment. • Properly dispose of toxic household trash. For example, batteries contain lead and mercury. Some household cleaners also contain substances that contaminate water. Many communities have special collection sites for these items. • Do not dispose of chemicals into septic systems, dry wells, storm water drainage wells or other shallow disposal systems that discharge to ground water. • Find out what your community is doing to protect your water source and get involved. Work with schools, civic groups and others to start a protection program.	 Provider Provider Provider Provider/CCHC

From National Training Institute for Child Care Health Consultants, 2004