



CHILDREN'S HEALTH AND THE ENVIRONMENT

The Issue

There is a growing concern about the effect that exposures to harmful chemicals or pollutants in indoor and outdoor environments can have on prenatal and child health. These effects are not always well understood. The best way to protect children is to decrease the amount of exposure to contaminants which may be found in the air, soil, dust, water, food and consumer products. When it comes to children, it is better to take a better to be safe than sorry approach (also known as “the precautionary principle”).

Why Children are More Vulnerable?

- **Children are proportionally different from adults**
Their small bodies require that they eat, drink and breathe more than adults. They also have a faster metabolism. Therefore, they are more exposed to contaminants found in the air, soil, dust, water, food and consumer products.
- **Children behave differently than adults**
Their small stature puts them closer to the ground and they also tend to explore more by crawling where contaminants are found. Small children also have a tendency to put their hands in their mouth increasing the amount of exposure to contaminants.
- **Children go through many growth and development stages**
There are many different stages of growth from conception, birth, childhood to 18 years of age. Exposure to contaminants at various stages can affect how a child develops.
- **Risk is greatest in the womb**
Different organs and systems develop during the nine months of pregnancy. Many contaminants easily cross the placenta and reach the fetus. Even low levels of exposure to certain chemicals can affect the health of the developing fetus.
- **Children have a longer life time ahead of them than do adults**
Exposure to some contaminants can cause permanent damage right away. Other contaminants can build up and be stored in body fat, bone or brain tissue where health problems may not become obvious for a long time, or until adulthood.

Health Concerns

While the science regarding the health links between environmental exposures and children's health is complex and often uncertain, the potential risks can be significant

Respiratory System

- Indoor and outdoor air pollution is associated with asthma, allergies and other breathing problems.
- Indoor exposure can include dust, moulds, pet dander, infections, chemicals and exposure to tobacco smoke.

Brain and Nervous System

- Substances that can harm the brain are referred to as *neurotoxic*.



- Neurotoxins are associated with visual or hearing deficits, behavioral problems, learning disabilities and autism spectrum disorders.
- Examples of neurotoxins include pesticides, PCB's, dioxins, lead, methylmercury and nicotine.
- Some of these neurotoxins even at low levels of exposure can permanently affect the brain particularly during prenatal brain development.

Reproductive system

- Agents that can harm the reproductive system are referred to as *reproductive toxicants*.
- Reproductive toxicants can affect both male and female reproductive systems.
- The female reproductive system can be affected in some of the following ways: infertility, miscarriage, changes in sexual behavior such as earlier onset of puberty, menopause and irregularities in the menstrual cycle.
- The male reproductive system can be affected in some of the following ways: changes in sperm count or shape which can also affect the developing fetus and increase risks of spontaneous abortions in women.
- Examples of reproductive toxicants include vinyl chloride, certain types of pesticides, phthalates and PCB's.

Child Development

- Agents that can harm the developing embryo, fetus or child are known as *developmental toxicants*.
- Some effects can include: miscarriage, stillbirth, low birth weight, preterm labour and birth defects.
- Examples of developmental toxicants include: methylmercury, lead, PCB's, organic solvents, some pesticides and air pollutants.

Endocrine System

- The endocrine system includes the body's hormone-producing glands. This system plays a variety of roles at different times in life.
- The endocrine, immune and nervous systems are closely linked and hormones play key roles in brain development and function of the nervous system.
- Certain chemicals called "*endocrine disruptors*" are suspected of interfering with the endocrine system's function.
- Some effects can include: changes in sex ratio, male birth defects, infertility, early onset of puberty and other similar effects seen in the child development and reproductive sections above.
- Examples of endocrine disruptors that may affect the endocrine system include: exposure to phthalates, PCB's, Bisphenol A, dioxins and furans and certain types of pesticides.

Immune System

- Immune system disorders occur when the immune system under-reacts (more difficult to fight infection) , overreacts(can cause the body to form antibodies and reacts against certain substances which may or may not be toxic) or reacts inappropriately.



- Effects of environmental exposures on immune system development and functioning are poorly understood.
- Examples of toxicants that may affect the immune system include PCB's, dioxins, pesticides and ultraviolet exposure.

Environmental Exposures in Child Care Settings

The following section gives examples of types of exposures to contaminants that may be found in a child care setting. Children may be exposed through ingestion, inhalation and skin contact.

- **Outdoor air pollution:** inhalation of a range of contaminants including ground level ozone, particulate matter, nitrogen oxides and metals.
- **Indoor and outdoor pesticide use:** inhalations or absorption of pesticides (used to control weeds and insects outdoors, and insects and rodents indoors) and their residues that may remain on food or in dust.
- **Inadequate ventilation:** inhalation of carbon monoxide and other contaminants that can be intensified by inadequate ventilation during renovations, painting and cleaning and while using art supplies.
- **Dust:** inhalation of contaminated dust from chemicals present in furniture, carpets, televisions, computers, plastic toys and cleaners. Through normal use, very small amounts of these chemicals end up in dust, along with pollutants that are tracked in from outdoors. These chemicals can include flame retardants, plasticizers such as phthalates, mercury, lead, nitrogen oxides (NOx), sulphur oxides(Sox), volatile organic compounds (VOCs) and pesticides.
- **Mould:** inhalation of spores from water-damaged drywall, carpets and excess moisture
- **Lead:** ingestion of peeling or chipped paint on interior and exterior walls, window sills, floors and other surfaces in any building or structure build before 1976, as well as toys illegally painted with lead-based paints.
- **Mercury:** skin contact with mercury from old-style glass thermometers that have been broken and ingestion of certain fish
- **Radon:** inhalation of this naturally occurring radioactive gas that can enter indoor air from surrounding soil and pose a significant lung cancer risk at elevated concentrations(particularly in combination with exposure to tobacco smoke).
- **Fragrances:** inhalation of fragrances(which often contain many chemicals) from plug-in or spray type air "fresheners" and cleaning agents as well as perfumes from staff members, visitors and parents.
- **Disinfecting cleaning products:** inhalation or skin contact with some types of cleaning products. Many commercial cleaning products contain substances known or suspected to be toxic.
- **Art supplies:** inhalation of VOCs and chemical fragrances from supplies like markers, glues and paint.
- **Chemicals from plastic food and beverage containers:** ingestion of various chemicals that leached into food and/or beverages after having been microwaved in plastic or poured as hot liquids into plastic containers (eg:bisphenol A - BPA) from polycarbonate baby bottles) or that have migrated from food packaging(for example,



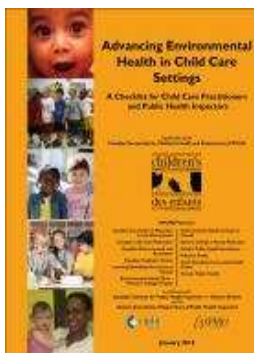
- most food cans are lined with BPA-containing epoxy) . As of March 2010, BPA in baby bottles is now banned in Canada
- **Chemicals from items like plastic toys:** Chemicals can also be ingested from soft plastic toys made of polyvinyl chloride (PVC) plastic, often referred to as vinyl, as these contain phthalates and sometimes lead. Health risks to children can occur if a child sucks or chews on items containing these chemicals. In June 2011, Health Canada introduced “*The Phthalates Regulations*” whereby restrictions have been introduced on phthalates in children’s toys and some child-care products..
 - **Physical locations of building:** VOCs , particulates and other outdoor air, soil and water contaminants may be present at child care facilities if they are sited near busy streets or industrial/commercial facilities.

Creating Healthy Environments for Children in the Day Care Setting

There are many opportunities to address environmental risks to child health within the work that you do or to decrease exposure to contaminants in children (also known as “environmental childproofing”)

The following resource has been designed by CPCHE especially for Child Care Practitioners.

All child care centres in Thunder Bay who require an inspection by a Public Health Inspector from the Thunder Bay District Health Unit should have received a free copy of this useful resource. It also includes additional local resources. You can contact your Public Health Inspector for more information.



Advancing Environmental Health in Child Care Settings: A Checklist for Child Care Practitioners and Public Health Inspectors: Canadian Partnership for Children’s Health & Environment, 2010

Downloadable copies available for free at www.healthyenvironmentforkids.ca

****Content adapted from CPCHE resources: *Child Health and the Environment- A Primer*; (2005 . Canadian Partnership for Children’s Environmental Health*) and *Advancing Environmental Health in Child Care Settings: A Checklist for Child Care Practitioners and Public Health Inspectors: 2010*****

Staff Training

Staff training opportunities related to children’s environmental health topics are available upon request free of charge. The training sessions are tailored to your needs in terms of content and time length



Training topics include:

- Smart and not so Smart Plastics
- Personal Care Products and Your Health
- Indoor/Outdoor Air issues
- GreenWashing! What You Need to Know!

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Additional Information

A List of resources can be found below at the following websites:

Thunder Bay District Health Unit's Children's Environmental Health Home Page
www.tbdhu.com/hbhf/ceh

Canadian Partnership for Children's Health & Environment
www.healthyenvironmentforkids.ca