

# Children's Environmental Health



## Gathering the facts and doing our part

By Bonnie Hamilton Bogart

### Why is Children's Environmental Health an issue?

Toxic exposures of children to environmental contaminants are occurring daily in our province and around the world, at exposure levels that are considered within allowable limits, as well as at more intensive exposure levels seen closer to heavily industrialized areas. These exposures deserve special scrutiny, because they are in some measure *preventable* causes of harm. There is knowledge and technology today to create solutions: we *can* reduce and eliminate exposures and promote safe alternative agents.

During the last decade, a proliferation of research studies have been undertaken in a wide variety of disciplines. Chemicals such as lead, mercury, PCBs (polychlorinated biphenyls), dioxin, furan, pesticides and solvents are now known to exert a toxic effect on early childhood development. There is now sufficient scientific evidence that prenatal or childhood exposures to these chemicals results in neuro-developmental conditions such as cognitive deficits, motor deficits, visual or hearing deficits, and cerebral palsy, as well as anemia, attention deficit hyperactivity disorder and renal function abnormalities. In addition, some childhood diseases are caused by, or exacerbated by, environmental contaminants such as some childhood

cancers, respiratory diseases and asthma.

Chemical exposures are important and preventable contributors to the above conditions. It is now understood that many diverse factors interact in complex ways to bring about these health effects, and that not all children respond in the same way to the presence of contaminants. Genetics and environmental factors (consisting of physical, chemical, infectious, nutritional and social factors) influence each individual's response to the presence of environmental toxicants. To further complicate matters, multiple exposures are often present in the same population or individual, thus confounding the analysis of health effects. All of these factors make the study of children's environmental health very challenging for researchers, health professionals and lay people. Consider the following:

**Children are more vulnerable than adults** — Children are not mini-adults. Their systems are much more highly sensitive than those of adults to the presence of contaminants in the air, water, soil and food.

**Physiological differences** — While in utero, the placenta transports chemical molecules easily across the placenta and into the bloodstream of the developing fetus. Cells are rapidly acquiring nutrients and, with them, any chemicals that are available. Because growth is proceeding so rapidly, the developing fetus or young child requires a much higher intake of water and other nutrients per unit of body weight, than those required by an adult, specifically, sevenfold for the

fetus and threefold for the young child. Children also have a higher metabolic rate, resulting in a higher take-up rate of air, water and nutrients as compared to adults. Further, children's immature organ systems are less able to detoxify substances such as pesticides from their system.

**Brain development** — Brain growth is maximal in the fetus and young child, and the blood-brain barrier in young infants is immature, allowing chemical molecules to cross this barrier at sensitive periods of brain development.

**Behavioral characteristics** — Children's small size and natural behaviors (crawling, mouthing toys, exploring, playing on the ground outside) put them in closer contact with heavy volatile substances, chemicals used on lawns and residual compounds in carpets.

**Genetics** — Some children are genetically predisposed to being more susceptible to certain compounds.

**Some children are more vulnerable than others** — It is well documented that some populations of children are at increased risk of health effects as a result of the environments in which they live.

Among the most vulnerable are:

- Children living in poverty often live in older housing where leaded paint may be an issue, or in areas closer to landfills, industry and congested roadways.
- Children living near heavily industrialized areas, especially mining and smelting areas, are at increased risk.
- Children whose nutritional status is low in calcium and iron can experience an increased uptake of lead and other contaminants.
- Aboriginal children or other groups are at higher risk if they regularly consume organ meat (particularly the liver and kidney of caribou, moose and seals), waterfowl, swordfish, shark, king mackerel, tuna and freshwater fish from areas contaminated with mercury.

- Unborn children are at increased risk if their mothers have been exposed to pesticides, lead, mercury, solvents, and certain cleaning agents, building materials and furnishings, either before or during their pregnancy.

### International, national and provincial contexts

Internationally, children's environmental health has been a "shared priority" since May 1997, when Environment Ministers of the G8 countries published *The Miami Declaration on Children's Environmental Health*. This document provides a basis for actions to improve the protection of children's health from environmental threats.

The Hon. David Anderson, Minister of Environment Canada, led an initiative that resulted in the *Cooperative Agenda for Children's Health and the Environment in North America*, signed off by Environment Ministers from the 3 NAFTA countries (Canada, USA and Mexico) on June 19, 2002.

Nationally, Health Canada now has an Office for Children's Environmental Health whose mandate is to both understand the special sensitivity of children to environmental threats and promote action to reduce the risk of these threats to children's health (Access the following Web site <http://www.hc-sc.gc.ca/hecs-sesc/occh/index.htm>). And the Hon. Paul Martin has announced a new public health agency, with a mandate to deal with emerging public health issues.

Provincially, Public Health has a mandate to address Children's Environmental Health, through their health protection mandate. At the same time, several government departments and agencies (e.g., Environment and Local Government, Energy, NB Power, Natural Resources, Agriculture, Fisheries and Aquaculture, Transportation) influence the amount of contamination to which pregnant women and children can be exposed.

These questions come to mind: Is there adequate, or indeed *any*, interaction among these departments on the topic of minimizing exposures to contaminants among pregnant women and children? Is there recognition among these stakeholders that children are "canaries in the coal-mine," and that we need to pay attention to their response to the presence of contaminants in the air, water, soil and food?

### What can the nursing profession do?

By improving our understanding of the role of contaminants in childhood illness, nurses and health care providers can help to influence public policy, promote the use of safer alternative agents, and within our immediate sphere of influence, reduce unnecessary risks to foetal and child development. Below are a few more ideas to begin the process:

1. Undertake a personal education program on the issues of environmental contaminants and children's health.
2. Adopt these straight-forward goals in their own nursing practice: *to create healthier environments for children and pregnant women, and to reduce exposures of children and pregnant women to environmental contaminants.*
3. Make children's environmental health a research priority, and promote the principle that health studies involving environmental contaminants must include a strong focus on the impacts on the health of pregnant women, their unborn babies and children.
4. Take every opportunity to familiarize major stakeholders with these issues.
5. Include environmental exposures when taking a nursing history (to include housing conditions, proximity to sources of contaminants such as industries, waste dumps, municipal incinerators and major traffic interchanges, and the possibility of toxic exposures of the mother before or during her pregnancy).
6. Provide patient education materials, and offer educational sessions to related health care staff, and to community groups.

### Conclusion

Because healthy child development is at the very heart of sustainability, our future as a society depends on how well we manage these risks today. Individually, we can make a difference. Collectively, we can shape the future.

### References

1. Canadian Environmental Law Association and the Ontario College of Family Physicians Environmental Health Committee. (2000). *Children's Health Project: Environmental Standard Setting and Children's Health*.
2. Canadian Institute of Child Health. (2000). *The Health of Canada's*

*Children* (Third Edition). Ottawa: Canadian Institute of Child Health.

3. Chance, Graham W. (2001). Environmental contaminants and children's health: Cause for concern, time for action. *Pediatric Child Health*. Vol 6, No. 10.
4. Commission for Environmental Cooperation (CEC) of North America. (2002). *Cooperative Agenda for Children's Health and the Environment in North America*.
5. Government of Canada. (2002). *Status Report on Implementation of the 1997 Declaration of the Environment Leaders of the Eight on Children's Environmental Health (Miami Declaration)*.
6. Greater Boston Physicians for Social Responsibility. (2001). *In Harm's Way: Toxic Threats to Child Development*. Boston: Greater Boston Physicians for Social Responsibility.
7. US Environmental Protection Agency. (1996). *Environmental Health Threats to Children and EPA's National Agenda to Protect Children's Health from Environmental Threats*. EPA 175-F-96-001.
8. Wigle, Donald T. (2003). *Child Health and the Environment*. New York, NY: Oxford University Press.

### Other sources of information

The World Health Organization has recently established the *Healthy Environments for Children Alliance (HECA)*, whose draft mission is: "A world-wide alliance to reduce environmental risks to children's health that arise from settings where they live, learn, play and sometimes work, by providing knowledge, increasing political will, mobilizing resources and catalyzing intense and urgent action" (Web site: [www.who.int/heca/eng](http://www.who.int/heca/eng)).

The *Canadian Partnership for Children's Health and Environment (CPHE)* is an affiliation of Canadian organizations working together to protect children's health from environmental contaminants. It was launched on National Child Day, November 20, 2003 ([www.healthyenvironmentforkids.ca](http://www.healthyenvironmentforkids.ca)).



**(Editor's note:** Bonnie Hamilton Bogart is a health and social consultant working in the Village of Gagetown.) □