

# Cluster Flies: Alternatives to Pesticide Use for Pest Control

*Helen Jones, EdD., RATE (Real Alternatives to Toxins in the Environment)*

2008

**Part One: Non-toxic solutions to cluster flies**

**Part Two: Health risks from pesticide use**

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## **PART ONE - NON-TOXIC SOLUTIONS TO CLUSTER FLIES**

Immediate help - a vacuum works well picking up cluster flies, or use the traps sold by NIC in Stevensville, Ontario.

Then... take steps to seal buildings well before the next fall migration of cluster flies indoors.

### **About Cluster Flies:**

From The ECOBUGDOCTOR

(Montreal-based nontoxic company; bilingual) <http://www.ecobugdoctor.com/main.htm>

The Cluster fly is often mistaken as a housefly. Cluster flies are distinguished from other flies by golden yellow hairs on the front and top of the thorax. Another noticeable feature is the way the wings are held flat over its back while resting; the wingtips overlap when held in this position.

These flies enter buildings in the fall through very small openings to "hibernate". At times, they are seen accumulating, particularly on a sunny facing. As the temperature drops and the days become shorter, more and more flies will enter wall crevices. Hundreds, or even thousands will "cluster"

in voids for wintering. These sluggish flies bother homeowners inside their homes in late winter and early spring. They awkwardly buzz about flying into lights and windows and colliding with objects and falling. On falling to the floor, they'll buzz loudly spinning on their backs, until exhausted. These flies are not attracted to our food, nor are they breeding in the house. Particular circumstances attract these wintering flies.

The Cluster fly life cycle begins with a female laying single eggs in the soil in the proximity of earthworms. In about three days the egg hatches and the larva begin to search for an earthworm. It burrows into the earthworm and parasitizes it. There, it will feed for about three weeks before pupating. An adult Cluster Fly emerges from its pupa after about 2 weeks. The adult fly feeds on flowers, and will have 3 or 4 generations through the summer months.

### **Three features that favour Cluster flies are:**

§ Surrounding landscapes of abundant earthworms,

- § A structure that stands out and has a sun-heated surface in the fall, and
- § Entry points into the structure for wintering.

### **Controlling Cluster Flies Without Pesticides**

1. Controlling the surrounding landscape or hiding the structure are not likely options. However, designing Cluster flies out is viable and a worthwhile option. In effect, it is like weather proofing a building. This exclusion must be done before the fall "invasion" of Cluster flies. Cracks and crevices at soffit and wall joints are commonly used for entry. Close and seal as many openings as possible through which the flies can enter. This procedure takes time to do, however the net effect makes the structure bug proof against many creatures while decreasing heating or cooling losses.
2. **Steve Tvedten's excellent and comprehensive website includes broad information and alternatives to control many pests including ants, fleas, bats, roaches, lice... and for chemical-free lawn care.**  
**<http://www.thebestcontrol.com/bugstop/>**
3. In the Natural Insect Control Catalogue  
<http://www.natural-insect-control.com/>  
Natural Insect Control  
R.R.#2, Stevensville, Ontario, Canada, L0S 1S0  
Phone: (905) 382-2904 Fax: (905) 382-4418  
Email: nic@niagara.com

### **CLUSTER BUSTER - Traps Cluster Flies Prod. ID: 3062**

“Do you have lots of flies on your windows in spring & fall? These are cluster flies - not a filth fly but they certainly can be a very big nuisance. Finally there is a non-toxic trap available that works well & quietly. Place trap per window where flies congregate. The flies will enter the trap and sink into the egg shell dust leaving them unable to escape and no annoying noise. Replace when full of flies. Very efficient and effective.”

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## **PART TWO - HEALTH IMPACTS FROM PESTICIDE/INSECTICIDE USE**

### **Pesticide Health Risks to Children and the Unborn: various resources**

#### ***Forward***

*This is not meant to be complete summary. Not included here, for example, is research being done at Duke University that suggests cholinergic pesticides (common insecticides that act on nerve synapse chemicals we have in common with many other animals, including insects) can lead to cell death in brain tissue in unborn lab animals. Also not cited are the studies that show ADHD and lowered I.Q. have been directly linked to pesticide exposure; that trace quantities of organophosphates and carbamate pesticides (commonly used insecticides) can trigger immune-suppression as marked as that induced by organ transplant drugs.*

*- Dr. Helen Jones*

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#### **OFFICE OF THE ATTORNEY GENERAL (OAG) - CANADIAN FEDERAL GOVERNMENT:**

In her third report to Parliament, the Commissioner of the Environment and Sustainable Development, Joanne Gelinac, examined the federal government's actions in response to specific commitments with implications for both human health and the environment. The Commissioner's audits deal with issues that affect all Canadians, notably the use of pesticides.

Both "The Commissioner's Perspective-2003" and "Chapter 1-Managing the Safety and Accessibility of Pesticides" examine a number of areas where the federal government, mainly through the efforts of Health Canada's Pest Management Regulatory Agency, is failing its role. <[http://www.oag-bvg.gc.ca/domino/cesd\\_cedd.nsf/html/03cesd\\_e.html](http://www.oag-bvg.gc.ca/domino/cesd_cedd.nsf/html/03cesd_e.html)>

Previous Commissioners of the Environment in the OAG have also stated that Canada is failing at regulating pesticides, noting that only Canada and the Slovak Republics do not keep track of pesticides sales. Commissioner of the Environment, Brian Emmett, stated in a news conference May 25, 1999, that "We are all paying the price in terms of risks to our health and our legacy to our children and grandchildren.

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## **MAJOR REPORT #1**

### **Ontario College of Family Physicians Pesticide Report (April, 2004)**

The full report is 179 pages and posted at the URL below, along with a few shorter commentaries. Look under "pesticides paper" (pdf file).

<http://www.ocfp.on.ca/English/OCFP/Communications/CurrentIssues/Pesticides/>

Report authors:

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The results of this systemic review cover studies done since 1992, and describe the findings regarding major adverse pesticide health effects, including:

- Solid tumours, including brain cancer, prostate cancer, kidney cancer and pancreatic cancer, among others
- Leukemia
- Non-Hodgkin's lymphoma
- Genotoxic effects
- Skin diseases
- Neurological diseases
- Reproductive effects
- Vulnerable patient groups, including children

### **Principle Findings of the Review:**

\* Many studies reviewed by the Ontario College show positive associations between solid tumours and pesticide exposure, including brain cancer, prostate cancer, kidney cancer and

pancreatic cancer, among others.

\* Previous studies have pointed to certain pesticides, such as 2,4-D and related pesticides, as possible precipitants of non-Hodgkin's lymphoma (NHL), and the findings of the College's review are clearly consistent with this.

\* It is clear from the review that an association exists between pesticide exposure and leukemia. According to the College, the implication of pesticides in the development of leukemia warrants further investigation and also, political action.

\* The review team uncovered a remarkable consistency of findings of nervous system effects of pesticide exposures.

\* Occupational exposure to agricultural chemicals may be associated with adverse reproductive effects including: birth defects, fetal death and intrauterine growth retardation.

### **Pesticide Effects and Children:**

Children are constantly exposed to low levels of pesticides in their food and environment, yet there have been few studies on the long-term effects of these exposures. Nevertheless, the College reviewed several studies that found associations between pesticide exposures and cancer in children. Key findings include:

\* An elevated risk of kidney cancer was associated with paternal pesticide exposure through agriculture, and four studies found associations with brain cancer.

\* Several studies in the review implicate pesticides as a cause of hematologic tumours in children, including non-Hodgkin's lymphoma and leukemia.

\* Some children have overall increased risk of acute leukemia if exposed to pesticides in utero or during childhood, especially for exposure to insecticides and herbicides used on lawns, fruit trees and gardens, and for indoor control of insects.

### **What Family Physicians Should Do:**

In the wake of this systemic review, the College is advocating that family physicians take the following measures:

\* screen patients for pesticides exposure at a level that may cause significant health problems, and intervene if necessary.

- \* Take patient pesticide exposure history when non-specific symptoms are present - such as fatigue, dizziness, low energy, rashes, weaknesses, sleep problems, anxiety, depression.
- \* Focus efforts on prevention rather than on researching the causes of chronic or terminal disease.
- \* Consider high-risk groups (e.g. children, pregnant women, seniors) in their practices.
- \* Advocate reduction or pesticide risk/use to individual patients.
- \* Advocate reduction of pesticide risk/use in the community, schools, hospitals and to governments.

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## **MAJOR REPORT #2**

### **The Children's Health Project "Environmental Standard Setting and Children's Health."(2000)**

The CHILDREN'S HEALTH PROJECT, "Environmental Standard Setting and Children's Health," released May 25, 2000, by the Ontario College of Family Physicians and the Canadian Environmental Law Association (CELA) contains over 80 pages of pesticide health risk documentation relating to CHILDREN (pp. 284-368).

To access the full study (about 400 pages), go to <http://www.cela.ca> , click on "Reports & Publications" on the left, and next in the Chronological Lists near the bottom choose "2000," then select the fourth report from the bottom - #387 Environmental Standard Setting and Children's Health ["Children's Health Project"]. Table 9.1 starts on page 366.

The pesticide risks to children take up 83 pages in this well documented report.

- § See Case Study #2: "Regulating Pesticides to Protect Children's Health" (pages 284-368, available online (PDF, Acrobat)).
- § The following table (Table 9.1) in this section is an excellent resource on health risks for bylaw discussions.  
Table 9.1, "Summary of Information on Selected Common Pesticides" appears on pages 366, 367, and 368. This three-page table is the only portion of the report that requires legal-size paper for printing (landscape orientation).

**Table 9.1 is a useful antidote to the incomplete information in most Material Safety Data Sheets (MSDS's) that industry supplies on commercial pesticide products.**

\* During the Halifax Regional Municipality hearings held on the proposed pesticide bylaw, the President of the Nova Scotia College of Family Physicians, Dr. Cathy MacLean, presented the above report in her speech to City Council, and indicated she was speaking on behalf of 500 family physicians in Nova Scotia.

Also included: Images of children's drawings showing developmental delays associated with pesticide exposures. These are part of the discussion of Elizabeth Guillette's research in: *Environmental Standard Setting and Children's Health* <titlepg.htm>

Inside the table of contents for this report, choose Case Study #2. The children's drawings are on page 32 of this 82 page unit.

“Thus, under the heading of Neurotoxicity (section 9.3.4.2), in "Regulating Pesticides to Protect Children's Health" (pp. 314 and 315), the research findings of Tulane University anthropologist, Dr. Elizabeth Guillette, are described showing behavioural and developmental delays in children, which correlate with pesticide exposures. These include noting increased aggression in children exposed to pesticides, in addition to the developmental delays revealed by the children's drawings.”

The BIBLIOGRAPHY for this section, on pages 358-364, provides an excellent literature review.

*"Our Children at Risk"*, a 30 minute video, has an even more complete visual presentation of drawings by children affected by pesticide exposures from Elizabeth Guillette's research.

The video is available for approximately \$15 from - Grassroots Environmental Education Science Driven. Solution Based.

<http://www.grassrootsinfo.org>

Grassroots Environmental Education • 52 Main Street • Port Washington, NY 11050

(p) 516-883-0887 • (f) 516-944-6586 • [info@grassrootsinfo.org](mailto:info@grassrootsinfo.org) ]

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## MAJOR REPORT # 3

### **Pesticides, Making the Right Choice For the Protection of Health and the Environment, Federal Report from the Standing Committee on Environment and Sustainable Development (2000):**

<<http://www.parl.gc.ca/InfocomDoc/36/2/ENVI/Studies/Reports/envi01-e.html>>

This website gives access to the table of contents. Each heading is a live link. Over a year in preparation with broad cross-party support from four federal parties, released May 16, 2000. Very well referenced.

#### **Four Key Quotes from this Federal Report and the pages where they are found:**

##### **Re: This is a health issue for all:**

“Pesticides are known to play, or are suspected of playing, a role in a myriad of diseases and developmental abnormalities, including: cancer [brain, breast,, stomach, prostate and testicles], childhood leukemia, reduced fertility, damage to the thyroid and pituitary glands, lowered immunity, developmental abnormalities and behavioural problems” (p.xviii).

##### **Re: Hazardous Unlisted Ingredients (so-called "Inert" Ingredients) and the fact that Physicians lack critical "proprietary" ingredient information that affects their ability to treat and diagnose pesticide poisoning:**

“It is evident to the Committee that the kind of in-depth and readily accessible information needed by medical practitioners to properly diagnose and treat cases of pesticide poisoning is lacking.” (s. 14.15, p. 138; s.13.3-13.9, p. 120-121).

##### **Re: The need for a Canada-wide removal of cosmetic landscape pesticides :**

“The Committee firmly believes that a moratorium on pesticide use for esthetic purposes is necessary until science has proven that the pesticides involved do not constitute a health treat...in urban areas. Pesticide use should only be permitted in an emergency, such as a serious pest infestation which threatens the health of people and the environment.” (s. 12.8, p.116)

##### **Re: The role of Health Canada's Pest Management Regulatory Agency:**

“To a certain extent, the PMRA is already a captive of the pesticide industry. The Agency must rely on the data supplied by pesticide manufacturers in assessing whether or not to register their products since it has no independent, in-house testing capacity...The cost recovery fees collected by the PMRA represent approximately 30% of the Agency’s operating budget. The PMRA’s heavy priorities might be skewed in favour of its revenue-generating activities [e.g. registering pesticides over those that do not generate revenue [e.g. promoting alternatives to pesticides, re-evaluating older pesticides and education the public about the risks of pesticide use].” (s.15.13, p.145)

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## MAJOR REPORT #4

In 2003, the U.S. Centers for Disease Control and Prevention (CDC), USA, tested 2644 persons for their body burden of pesticides: two significant results revealed that all the subjects tested were contaminated, and that the highest levels of pesticides were found in children.

*Chemical Trespass: Pesticides in Our Bodies and Corporate Accountability*, made public for the first time an analysis of pesticide-related data collected by the US-based Centers for Disease Control and Prevention (CDC) in a 2003 study of levels of chemicals in 9,282 people nationwide.

So far, Health Canada's Pest Management Regulatory Agency has failed to make similar comprehensive measurements of the pesticide body burden of Canadians. Experts expect these to be at even higher levels due to atmospheric transport toward northern latitudes.

### CENTERS FOR DISEASE CONTROL AND PREVENTION STUDY

Laboratory testing conducted by the Centers for Disease Control and Prevention (CDC) on over nine thousand people in the USA revealed that all the tested subjects had a body burden of chemicals and pesticides. The highest levels were found in little children.

For a summary, see page 18 of this document. Or,

For details, refer to:

<http://www.panna.org/campaigns/docsTrespass/chemicalTrespass2004.dv.html>

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## MAJOR REPORT #5

This is a copy of a presentation that was made to the House of Commons Standing Committee on Health by Dr. Margaret Sanborn on the last day of the hearings on the Pest Control Products Act. Dr. Sanborn is an outstanding Canadian physician. Among other things, Dr. Sanborn cited research in her report that shows 35.5% of children belong to a genetic subgroup which is even more vulnerable to commonly used pesticides than all children are already known to be.

### **Briefing notes -Bill C 53 Pest Control Products Act May 9, 2002**

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“...about one-third of Canadian children are born with a specific inability to detoxify commonly used pesticides, and a corresponding increased vulnerability to adverse health effects including cancer.” -p. 2

[results from a Montreal study of acute lymphocytic childhood leukemia following home and garden pesticide use during pregnancy (Infante-Rivard C., et al., 1999.)

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I appreciate the opportunity to speak with you today.

I will briefly discuss two health effects of concern from the routine use of pesticides, and then relate these to proposed changes in the bill.

Pesticides are designed to kill something. The mechanisms for doing this involve disruption of processes inside the cell. The ability of the chemical to do this means that it can also disrupt human cell processes. I will focus on two of these: neurodevelopmental effects, and reproductive effects.

### **Neurodevelopmental Effects**

The human brain has 100 billion neurons, and an exponentially larger number of synapses, or connecting links between neurons. From birth to 2 years of age, the child's brain goes through unique growth and change. These growth processes include synaptogenesis, or formation of the connecting links between the nerve cells, and maturation and differentiation of specialized nerve cells. This process is mostly completed by age two, and then forms the 'hard wiring' of the brain for the rest of life. Examples of brain functions which are sensitive to the quality of brain development during this period include gross motor skills, coordination of movement, ability to process multiple simultaneous inputs, and adjusting to a new environment.

The effect of pesticides on brain formation, or neurodevelopment, is an area of great concern. Animal studies have shown that pesticide-exposed rats and mice have fewer brain cells, permanent changes in the levels of neurotransmitters (messenger chemicals) in the brain, defective cell-to-cell signalling, and hyperactive behaviour which persists into adult life. These changes occur at exposure levels which do not evoke overt toxicity. They also occur from pesticides in current household use, such as chlorpyrifos and pyrethroids-substances previously thought to be much safer than the old organochlorine insecticides.

It is clear that the brains of children are more susceptible to pesticide effects. For example, in pesticide poisonings, 25% of children present with seizures as a symptom; in adults only 2-3% present with seizures.

In children, we are concerned about sharp increases in the rates of autism and attention deficit disorders (previously called hyperactivity). Health Canada has stated recently that 28% of

Canadian children under the age of 12 have an identified learning or behaviour problem. Apart from these known clinical disorders, there is a spectrum of less severe problems which involve memory and attention, and affect learning ability and skills to socialize and form relationships. Given the animal data, it is a concern that some of the increase in these problems may be pesticide-related. It is instructive to note that the recent quiet withdrawal of DEET formulations over 30% was done because of neurodevelopmental toxicity.

I would like to draw attention to the dramatic population effects caused by small reductions in brain function. A reduction of only 5 IQ points across the whole population causes a 57% increase in those classified as “mentally challenged”, and a corresponding 57% decrease in those classified as “intellectually gifted”. The economic and social costs of such a shift, both in increased health and social costs at the lower end, and reduced capacity for innovation and knowledge-based economic output at the upper end, are enormous. I believe these concepts deserve serious consideration when cost-benefit , or ‘health risk-value” analyses of pesticides are conducted.

## **Reproductive Effects**

The developing fetus has a critical period between 3-8 weeks gestation when major organs are being formed. This is the period when pesticides appear to have their strongest effect; it is also a time when women may be unaware they are pregnant. A study done in California showed that maternal pesticide exposure from 3-8 weeks was associated with an increase in miscarriages due to major birth defects. The Ontario Farm Family Health Study documented a 40-50% increase in early spontaneous abortions in farm women exposed to 2,4-D or atrazine type herbicides before conception. Research done in Montreal has shown that fetuses exposed to pesticides by maternal home and garden use during pregnancy have a 2-5X risk of developing acute lymphocytic leukemia by age 9. The risk of leukemia is highest if the child has one of two genetic subtypes which cause an inability to break down pesticides. This genetic subtype is not a rare occurrence; in the Montreal study it was present in 35.5% of children. In other words, about one-third of Canadian children are born with a specific inability to detoxify commonly used pesticides, and a corresponding increased vulnerability to adverse health effects including cancer.

Cancer in Canadian children under age 15 has doubled over the past 25 years.

I will now discuss specific recommendations for the bill related to the health concerns discussed above.

### **1. Aggregate Vs Cumulative-definitions reversed**

On page 14 , line 15-23 of the bill, the explanations of aggregate and cumulative are reversed from the usage in the scientific literature. Aggregate exposure should refer to exposures to different pesticides. Cumulative exposure should refer to exposure to the same pesticide from different sources.

## **2. Use of the Weight of Evidence Approach**

Many witnesses will have urged for a more integrated use of the precautionary principle in this bill, and I agree with these urgings. A companion concept to the precautionary principle must be the weight of evidence approach which has been advocated by the International Joint Commission, and in Health Canada reports such as the State of Knowledge Report on Environmental Contaminants and Human Health in the Great Lakes Basin (Health Canada, 1997).

### **Definition**

The Health and Environment Handbook for Health Professionals (Health Canada, 1998, p. 23) defines the weight of evidence approach as one which "...recognizes the limitations of science and takes into account the combined results of many kinds of research. ... Conclusions about the risks posed by a contaminant are based on data collected from laboratory animal studies, wildlife studies, human epidemiologic studies of acute exposure, studies of more subtle effects on humans from chronic low-level exposures, and socioeconomic data and research as well".

The definition of this approach would be an appropriate addition to the preamble. It would also provide a relevant and powerful guiding principle in all clauses outlining decisions where human health risks are being weighed against a product's value: registration, re-evaluation and special review, and amendment.

As an example of the precautionary principle's application to legislation, the European Union has a recent measure which sets a limit of .01 mg/kg for every individual pesticide for processed cereal-based baby foods and infant formulae, pending toxicologic evaluation of the pesticides.

## **3. Reporting of Pesticide Related Illnesses**

A mandatory system requiring health professionals to report adverse health effects of pesticides is needed and should be included in the bill. Such systems are long-standing in Britain, South Africa and California. Without this information, health-risk/value analyses occurring at re-evaluation and review are lacking critically important evidence on the toxicity of the product.

In one area of South Africa, an awareness campaign about pesticide health effects among health care providers, in an area where reporting was already mandatory, resulted in a 10-fold increase in reports of pesticide poisonings over the following year.

## **4. Acceptable Risk**

The bill contains no definition of acceptable risk, although the concept is key to many

ministerial decisions.(pages 2,14,20). How this is defined has great consequences for human health, and should be defined in the bill. For example, definitions of ‘acceptable’ cancer risk have ranged between 1 excess cancer death per year per 10,000 persons exposed to one excess death per year per million persons exposed. The less protective definition results in 99 more cancer deaths per year.

### **5. 15 years is too long**

All the human health studies I have cited today were published in the last 3 years. The rate of new knowledge development in this field makes 15 years too long an interval for re-evaluation.

In summary, the spirit of Bill C53 in asserting the primacy of human health concerns and identifying vulnerable subgroups is highly commendable. The specifics need some strengthening in order to achieve and enforce this principle.

### **References**

#### Neurodevelopmental

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3. Tirado C. Children's health and environment. Chapt. 11 Pesticides. European Environment Agency and World Health Organization European Region. Apr. 2002: pp152-160. Online at [reports.eea.eu.int/environmental\\_issue\\_report\\_2002-29/en/eip\\_29.pdf](http://reports.eea.eu.int/environmental_issue_report_2002-29/en/eip_29.pdf)

#### Reproductive

1. Bell,EM, Hertz-Picciotto I , Beaumont JJ. A case-control study of fetal death due to congenital anomalies. *Epidemiology* 2001 Mar; 12(2): 148-56.
- 2.Ar buckle TE, Lin Z,Mery LS. An exploratory analysis of the effect of pesticide exposure on the risk of spontaneous abortion in an Ontario farm population. *Env Health Perspect*. 2001 Aug;109(8):851-7.
- 3.Infante-Rivard C, Labuda D,Krajinovic M, Sinnett D. Risk of childhood leukemia associated with exposure to pesticides and with gene polymorphisms. *Epidemiology* 1999; 10(5):481-7.

#### Weight of Evidence

The health and environment handbook for health professionals. Great Lakes Health Effects Program, Health Canada,1998, Cat. No. H46-2/98-211-2E.

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## PUBLICATIONS

**Genetic Link Found for Pesticides, ADHD, Gulf War Syndrome** is an example of research demonstrating a causal relationship between Organophosphate pesticides and Attention Deficit Hyperactivity Disorder (ADHD). Organophosphates and carbamates are the type of pesticide used against flies and other insects. The health impacts are the same, whether they are used for landscape or for treating the interior of buildings. The only difference would be the increased likelihood of harm because of the higher concentrations and residual long term off-gassing associated with the treatment of indoor spaces.

One of the most significant aspects of these impacts is that any genetic damage that takes place will be MULTIGENERATIONAL. The genetic damage caused by a pesticide harms not just the individuals that were exposed, but all of those individuals' offspring for many generations to come. - *Dr. Helen Jones*

### **Genetic Link Found for Pesticides, ADHD, Gulf War Syndrome**

Genetic Link Found for Pesticides, ADHD, Gulf War Syndrome LA JOLLA, California, March 17, 2003 (ENS) - Supported by a \$1.5 million grant from the U.S. Department of Defense, research at the Salk Institute have identified a gene that may link certain pesticides and chemical weapons to a number of neurological disorders, including the Gulf War syndrome and attention deficit/hyperactivity disorder (ADHD). The finding, published in the March 17 online version of "Nature Genetics," is the first to demonstrate a clear genetic link between neurological disorders and exposure to organophosphate chemicals.

The gene is one that scientists had not studied in previous efforts to find connections between these chemicals and disease. Organophosphates include household pesticides as well as deadly nerve gases like sarin.

The Gulf War syndrome is a "loosely defined collection of symptoms," the researchers said, "ranging from headache and fever to severe forgetfulness and movement disorders." It was first noted after Operations Desert Storm and Desert Shield in 1991, when U.S., Canadian and British military veterans reported more symptoms than soldiers who were not deployed. Its cause is unknown.

Dr. Carolee Barlow, who led the work at the Salk Institute and is now at Merck and Co., Inc., and her team, headed by Christopher Winrow, found in mice that organophosphate exposure inhibited the activity of a gene called neuropathy target esterase, or NTE. The gene is active in parts of the brain controlling movement - the hippocampus, the cerebellum and the spinal cord.

This inhibition either killed the mice before birth, or led to a range of behaviors very similar to ADHD. Some of the neurological problems were similar to symptoms seen in Gulf War syndrome.

"This study shows that there may indeed be a genetic connection that explains how organophosphates can cause these reactions; it's just not what we assumed it would be," Barlow said.

"There have been anecdotal links made between rises in attention deficit/hyperactivity disorder, Parkinson's disease and other disorders and exposure to pesticides," she said. "There also has been suspicion of a link to Gulf War syndrome. But scientists have been focusing on enzymes that act on acetylcholine neurotransmitters.

Barlow's group had originally been looking at how environmental factors immediately affect the nervous system. They found that mice bred to lack the NTE gene died before birth.

But the group also found that mice with only one copy of the NTE gene, when exposed to experimental organophosphates and examined over a prolonged period, exhibited behavior similar to attention deficit/hyperactivity disorder.

"NTE is a large gene," said Barlow. "It's possible that we all have slightly different forms of the NTE enzyme, which may explain why some may get ADHD when they're exposed at young ages, and why some may get Gulf War syndrome at a later age, or why some of us have no symptoms at all. It appears to be a case of delayed toxicity, inhibiting the function of NTE."

*The Salk Institute for Biological Studies is an independent nonprofit organization dedicated to fundamental discoveries in the life sciences, the improvement of human health and conditions, and the training of future generations of researchers. The institute was founded in 1960 by polio vaccine discoverer Jonas Salk, M.D., with a gift of land from the City of San Diego and the financial support of the March of Dimes Birth Defects Foundation.*

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### **Neuroblastoma Linked to Homes Treated with Pesticides**

SOURCE: Epidemiology: 12(1):20-26, January, 2001

Website: <http://www.chem-tox.com/pesticides/#neuroblastoma>

One of the largest studies to date has found that pesticide use around the home can more than double the chance of a child developing neuroblastoma. Neuroblastoma accounts for approximately 10% of all childhood tumours.

There are 550 new cases in the United States each year, with an annual incidence rate of 9.2 cases per million children under 15 years of age. This works out to approximately 1 per 100,000

children under age 15 on a national level. (These rates were reported in the book "Principles and Practice of Pediatric Oncology, Lippincott-Raven, 1997). It is a very serious cancer as approximately 60% of children over age 1 who develop neuroblastoma do not live 3 years even when receiving treatments of radiation and chemotherapy. Children under age 1 have a more positive prognosis. As statistics show that neuroblastoma rates have increased over the past 50 years, it is reasonable to assume environmental factors may be involved.

One of the largest collaborative efforts among 7 Universities and medical facilities worked together to determine what extent pesticide use in the home could increase child neuroblastoma rates. 390 neuroblastoma children and 460 non-cancer controls were included in the study. Investigators questioned both parents regarding use of pesticides in and around the home.

Results showed that using pesticides in and around the home resulted in a 60% increased likelihood of children developing the disease (Odds Ratio=1.6). Looking at pesticide use for the lawn and garden only resulted in an increased risk of 120% (Odds Ratio=2.2) when the mother had applied pesticides in the yard and 50% higher (Odds Ratio=1.5) when the father had applied pesticides in the yard.

Julie L. Daniels, Andrew F. Olshan, Kay Teschke, Irva Hertz-Picciotto, Dave A. Savitz, Julie Blatt, Melissa L. Bondy, Joseph P. Neglia, Brad H. Pollock, Susan L. Cohn, A. Thomas Look, Robert C. Seeger, Robert P. Castleberry, Department of Epidemiology, School of Public Health, University of North Carolina, Chapel Hill, University of British Columbia, University of Texas, University of Minnesota, University of Florida, Northwestern University, Department of Experimental Oncology, St. Jude Children's Research Hospital and University of Alabama.

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Sent: February-06-08 4:33 AM

Subject: [sprayno] **Impact of low-level exposure to organophosphates on human reproduction and survival.**

Trans R Soc Trop Med Hyg. 2008 Jan 31 [Epub ahead of print]

Impact of low-level exposure to organophosphates on human reproduction and survival.

Peiris-John RJ, Wickremasinghe R.

Department of Physiology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

Despite their widespread and longstanding use for the public good, organophosphate (OP) pesticides have led to many adverse effects on human health. Environmental exposure to OPs and adverse reproductive outcomes in men and women working on or living near farms are increasingly reported worldwide. The aim of the current review is to determine whether exposure to OPs, at levels lower than that which results in clinical manifestations of acute OP poisoning, leads to an adverse impact on fertility, growth and development, and to highlight possible effects for further investigation. There is evidence of impaired fertility due to a reduction in semen

quality and possibly lower testosterone levels in exposed males. There is also evidence of impairment of fetal growth and development brought about by prenatal exposure to OPs. Paraoxonase gene (PON1) activity in the fetus and during early childhood makes the fetus and child more vulnerable to OP poisoning, suggesting that OP exposure has a greater impact on fetal and infant growth and development than on adults when exposed to the same concentrations of pesticides. This review raises concerns that exposure to OP pesticides at levels currently regarded as safe adversely affect human reproductive function and survival.

PMID: 18242652 [PubMed - as supplied by publisher]

<http://www.ncbi.nlm.nih.gov/pubmed/18242652?dopt=AbstractPlus>

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Sent: January-28-08 2:15 PM

**Two common childhood cancers have been linked to prenatal exposure to household pesticides according to a new study from France.**

Researchers found that use of any pesticide by the mother during pregnancy increased her child's risk for acute leukemia and non-Hodgkin lymphoma. Maternal use of insecticides on pets and in the home, and to a lesser extent herbicides, was linked to acute leukemia. Non-Hodgkin lymphoma was associated with garden crop insecticides used by the mothers.

The study, involving hundreds of children, compared information about children with leukemia and lymphoma to children who were cancer-free. To assess the potential effect of a child's prenatal pesticide exposure, researchers examined information about the mother's pesticide use during the pregnancy. They also looked at the father's use of pesticides during the pregnancy and the child's early years. In this study paternal pesticide use appeared to be less of a risk factor than maternal use.

The authors point out that other studies have found similar effects, suggesting that pregnant women should avoid using pesticides.

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**Childhood Leukemia and Lymphoma Linked to Pesticides**

<<http://ent.groundspring.org/EmailNow/pub.php?module=URLTracker&cmd=track&j=186712195&u=1877426>>

Summary:

Keep the Sprays Away? Home Pesticides Linked to Childhood Cancers.

Tina Ader. Environmental Health Perspectives 115(12):A594

<http://www.ehponline.org/docs/2007/115-12/ss.html#keep>

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 Key reference showing pesticides move indoors and remain there for up to a year, where they were never licensed for use.

**Measuring Transport of Lawn-Applied Herbicide Acids from Turf to Home: Correlation of Dislodgeable 2,4-D Turf Residues with Carpet Dust and Carpet Surface Residues.**

Nishioka, Marcia G., Hazel M. Burkholder, Marielle C. Brinkman, and Sydney M. Gordon (1996) Environmental Science and Technology, Vol. 30, No. 11, pp. 3313-3320.

Abstract: “Transport of lawn-applied herbicides into the home via walking over treated turf, defined here as track-in, was measured at five different times out to 1 week after application. Residues of turf-applied 2,4-D and dicamba were measured in carpet dust and on the carpet surface after track-in. Both carpet dust levels and carpet surface dislodgeable residue levels were highly correlated with turf dislodgeable residues. Turf dislodgeable residues were 0.1-0.2% of turf application levels. TRANSFER OF HERBICIDES FROM TURF TO CARPET DUST WAS 3% OF THE TURF DISLODGEABLE RESIDUES.” (caps added) “Herbicide 2,4-D was measured in the carpet dust of suburban homes at the 0.1-5 micron-grams/g levels that are predicted by this efficiency of mass transfer. ... .”

Further, the paper also has useful sections on (1) the effects of rainfall on the indoor track-in findings, (2) a correlation with the amount of track-in and the number of children in a home\* (Table 4), and (3) the relevance of other research documenting 2,4-D in children’s urine to the possibility of exposure to indoor carpet residues (p. 3320). \*Relevant to assessing the potential for track-in of pesticide residues indoors into schools as well.

When this paper appeared it could have resulted in an immediate moratorium on landscape pesticide use. Health Canada’s Pest Management Regulatory Agency (PMRA) is fully aware of research findings showing that pesticide residues enter the home and persist in the indoor environment, yet the regulatory agency has not acted to protect Canadian families.

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**Summary: CENTERS FOR DISEASE CONTROL AND PREVENTION STUDY**

**Many North American Residents Carry Toxic Pesticides Above “Safe” Levels**

**Report shows Children and Women Shoulder Heaviest “Pesticide Body Burden”. Ottawa.**

A report released today (January 2003) in the US reveals that government and industry have failed to safeguard public health from pesticide exposures. While Canada refuses to monitor the chemical and pesticide body burdens of its citizens, many U.S. residents carry toxic pesticides in their bodies above government assessed “acceptable” levels, according to a report released today by Pesticide Action Network North America (PAN), Sierra Club of Canada and Coalition for Alternatives to Pesticides(CAP). Chemical Trespass: Pesticides in Our Bodies and Corporate Accountability, makes public for the first time an analysis of pesticide-related data collected by

the US-based Centers for Disease Control and Prevention (CDC) in a study of levels of chemicals in 9,282 people nationwide.

“None of us choose to have hazardous pesticides in our bodies indeed communities across Canada are banning the cosmetic use of pesticide in an attempt to limit our exposure to toxic pesticides” explained Michel Gaudet, President of the Coalition for Alternatives to Pesticides “Yet the CDC found pesticides in 100% of the people who had both blood and urine tested. The average person in this group carried a toxic cocktail of 13 of the 23 pesticides analyzed.” Many of the pesticides found in the test subjects have been linked to serious short- and long-term health effects including infertility, birth defects and childhood and adult cancers.

While the Canadian government develops safety levels one chemical at a time, this study shows that in the real world we are exposed to multiple chemicals simultaneously. The synergistic effects of multiple exposures are unknown, but a growing body of research, including the recent Ontario College of Family Physicians report, suggests that even at very low ‘acceptable’ levels, the combination of these chemicals can be harmful to our health. Chemical Trespass found that children, women and Mexican Americans shouldered the heaviest “pesticide body burden.” For example, children—the population most vulnerable to pesticides—are exposed to the highest levels of nerve-damaging organophosphorous (OP) pesticides. The CDC data show that the average 6 to 11 year-old sampled is exposed to the OP pesticide chlorpyrifos at four times the level U.S. Environmental Protection Agency considers “acceptable” for a long-term exposure. Chlorpyrifos, produced principally by Dow Chemical Corporation and found in numerous products such as Dursban™, is designed to kill insects by disrupting the nervous system. Despite Sierra Club of Canada’s calls to ban chlorpyrifos, the product is still registered for use in Canada. In humans, chlorpyrifos is also a nerve poison, and has been shown to disrupt hormones and interfere with normal development of the nervous system in laboratory animals.

Dave Bennett, Canadian Labour Congress Director of Health, Safety and Environment was shocked by the findings. "Not only do vulnerable groups such as children and workers have an elevated burden of pesticides in their bodies, but the general population does as well. The only answer is to severely restrict the USE of chemical pesticides, by elimination or the substitution of less unsafe alternatives. The authors' prescriptions for the US are applicable to Canada. The CLC has long argued that the pesticide registration system should be changed: alternative pest management strategies must get priority over spreading chemical poisons on human beings and the environment."

The report also found that women have significantly higher levels of three of the six organochlorine (OC) pesticides evaluated. This class of pesticides is known to have multiple harmful effects when they cross the placenta during pregnancy, including reduced infant birth weight and disruption of brain development, which can lead to learning disabilities and other neurobehavioral problems. This ability of organochlorine pesticides to pass from mother to child puts future generations at serious risk. “The fact that American children carry dangerous pesticides in their bodies represents a dramatic failure in the way both of our governments regulate toxic pesticides,” said Elizabeth May, Executive Director, Sierra Club of Canada.

“Health Canada must commit to a cross-Canada sampling of the pesticidal body burden of Canadians. It is the first step in shifting the burden from our bodies back to the corporate boardroom where it belongs.”

Pesticides and chemicals, which pervade our environment, are alien and destructive to our bodies, at times distorting normal metabolic processes, and triggering tumour development and other disease outcomes by mimicking hormones, being stored for years in fatty tissue, contaminating breast milk, damaging reproductive and neurological processes such as learning, intelligence, and mood stability, as well as derailing other essential functions. The long term effects of these exposures and of the mixing of these chemicals in our bodies, which can vastly multiply the known toxicity of individual chemicals (synergism) are only partially understood. The few studies done on synergism at very low levels show that the magnified effects should be a matter of grave public concern.

Many of the pesticides found in the test subjects have been linked to serious short and long-term health effects including infertility, birth defects, immune system damage, and childhood and adult cancers.

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#### STUDY SOURCE:

**Household exposure to pesticides and risk of childhood hematopoietic malignancies:** The ESCALE study (SFCE).

Rudant, J. et al. 2007.

Environmental Health Perspectives 115(12):1787-1793

<http://www.ehponline.org/members/2007/10596/10596.html>

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#### WEB RESOURCES

America's Children and the Environment (2003)

[www.epa.gov/envirohealth/children](http://www.epa.gov/envirohealth/children)

A report by the U.S. EPA indicating concentrations of environmental contaminants in the bodies of mothers and children as well as childhood diseases that may be influenced by environmental factors.

BodyBurden: The Pollution in People

[www.ewg.org/reports/bodyburden/index.php](http://www.ewg.org/reports/bodyburden/index.php)

A study by the Environmental Working Group with comprehensive studies on multiple chemical contaminants in humans, from newborns to grandparents.

In Harm's Way: Toxic Threats to Child Development

[psr.igc.org/ihw-report.htm](http://psr.igc.org/ihw-report.htm)

A report by Greater Boston Physicians for Social Responsibility examining the environmental contributors to learning, behavioral and developmental disabilities.

The State of Children's Health and the Environment 2002

[www.chechnet.org/report/report.shtml](http://www.chechnet.org/report/report.shtml)

A report from CHEC documenting solutions for parents and policy makers

Center for Children's Health and the Environment

[www.childenvironment.org](http://www.childenvironment.org)

Affiliated with Mount Sinai School of Medicine, this center provides resources for protecting children against environmental toxins.

Children's Health Protection

[yosemite.epa.gov/ochp/ochpweb.nsf/content/homepage.htm](http://yosemite.epa.gov/ochp/ochpweb.nsf/content/homepage.htm)

Office of the U.S. EPA established to protect children's health from environmental risks.

THE CANADIAN ENVIRONMENTAL LAW ASSOCIATION (CELA)

<http://www.cela.ca/reports/2000.shtml>

Environmental Standard Setting and Children's Health. A report by the Children's Health Project, a joint effort of the Canadian Environmental Law Association and the Ontario College of Family Physicians Environmental Health Committee. K. Cooper, L. Vanderlinden, T. McClenaghan, K. Keenan, K. Khatter, P. Muldoon, A. Abelson, May 2000 \$40.00 copy; \$20.00 CD-ROM.

And their children's health home page

<http://www.healthyenvironmentforkids.ca/english/>

Pesticides used in our communities -- human health and environmental impacts

Revised September 25, 2003 . 2 page table - with 30 up-to-date references -

[http://www.healthyenvironmentforkids.ca/img\\_upload/13297cd6a147585a24c1c6233d8d96d8/impacts\\_1.pdf](http://www.healthyenvironmentforkids.ca/img_upload/13297cd6a147585a24c1c6233d8d96d8/impacts_1.pdf)

This table includes a listing of health risks of insecticides, Carbaryl (e.g., Sevin), Glyphosate, and Malathion, as well as those for 5 common herbicides and 4 fungicides.

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## OTHER SOURCES

- Alanna Mitchell, Globe and Mail, Saturday 24 April 2004,  
"Pesticides too harmful to use in any form, doctors warn."

- Pesticide Exposures in Schools (U.S. examples)

"UNTHINKABLE RISK" - A comprehensive and well referenced recent report documenting

exposures to children from pesticides at school from the Northwest Coalition for Alternatives to Pesticides (NCAP). This 51 page report can be accessed at: <<http://www.pesticide.org/UnthinkableRisk.html>>

Illustrates the physiological vulnerability of children and examples of school pesticide exposures.

- Unintended Casualties: <<http://www.pesticide.org/IncidentsFiveStories.pdf>>

Five Stories of Children Whose Lives Were Profoundly Affected by Exposure to Pesticides at School. This 5-page supplementary packet highlights five school pesticide exposure incidents and personalizes them in a way not possible in the Appendix of the larger report. [PDF 128K] (several b & W photos).

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<http://www.ocfp.on.ca/English/OCFP/Communications/CurrentIssues/Pesticides/default.asp?s=1>

- <http://www.panna.org/campaigns/docsTrespass/chemicalTrespass2004.dv.html>

- Raising Healthy Children in a Toxic World by Philip Landrigan, Herbert Needleman and Mary Landrigan (Rodale, 2001)

- Having Faith by Sandra Steingraber (Perseus Books, 2001)

- Our Children's Toxic Legacy (2nd edition) by John Wargo (Yale University Press, 1998)

- Children's Health Environmental Coalition (CHEC) [www.checnet.org](http://www.checnet.org)

A national non-profit organization dedicated to educating the public, specifically parents and caregivers, about environmental toxins that affect children's health.

- Children's Environmental Health Network [www.cehn.org](http://www.cehn.org)

A national multidisciplinary organization whose mission is to protect the fetus and child from environmental health hazards.

- Environment and Human Health [www.ehhi.org](http://www.ehhi.org)

A nonprofit organization dedicated to protecting human health from environmental harms through research, education and the promotion of sound public policy.

- Institute for Children's Environmental Health [www.iceh.org](http://www.iceh.org)

A nonprofit educational organization working to ensure a sustainable future for all children by reducing and ultimately eliminating environmental exposures.

*Dr. Helen Jones, MSc., Hon. Zool. (UBC), EdD. (Col. Univ.) is a past member of the Pesticide Bylaw Advisory Committee for Halifax Regional Municipality, Nova Scotia, a Board Member of Real Alternatives to Toxins in the Environment (RATE), member of Pesticide Free Nova Scotia, and is widely respected for her work in the field of pesticides as they relate to human health.*

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