

NON-ESSENTIAL USE OF PESTICIDES

Position of the Simcoe Muskoka District Health Unit

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OVERVIEW

The purpose of this paper is to summarize key findings related to the potential for health effects from pesticides. This document is not intended to provide a critical and comprehensive review of the toxicological and epidemiological literature on the health effects of pesticides. Its purpose is to provide some background and perspective to guide the health unit's response to public and municipal concerns related to the non-essential use of pesticides.

Pesticides are chemical or biological agents designed to reduce or eliminate specific pests, most often insects, plants or fungi. This paper will primarily focus on insecticides and herbicides used in lawn care and maintenance. In addition, this report is in response to local community requests for the health unit's position on the health effects of pesticides and strategies to reduce or eliminate pesticide use. Non-essential use of pesticides refers to the use of pesticides for aesthetic reasons, primarily to maintain lawns and gardens. Essential use of pesticides refers to the use of pesticides to protect public health, protect forests against insect infestations or protect agricultural products from adverse impacts.¹

There is increasing concern from the public, health professionals and organizations regarding the non-essential use of pesticides as more research studies have been completed. Although conclusive information is not available, there is some evidence to suggest that pesticide use can harm human health.

HEALTH EFFECTS

Health effects from acute exposure to pesticides are well documented and include respiratory reactions, nausea, vomiting, diarrhea and headache.²

Chronic health effects are much more challenging to determine. Studies have focused on long term health effects (including occupational exposures); some have found associations between pesticide exposure and health problems including:³

- Cancer, including leukemias & lymphomas.⁴ Research from experimental cell cultures, occupational studies and meta-analysis.
- Reproductive effects (including fertility problems, birth defects, adverse pregnancy outcomes). Research not restricted to lawn and garden pesticides.⁵
- Neurological effects. Research includes epidemiological and experimental, primarily resulting from occupational exposures.⁶

Immune system suppression, endocrine alterations, and respiratory effects from pesticide exposure are other health effects that researchers are examining. Despite the fact that most insecticides are neurotoxic, there are very few animal studies and even fewer epidemiological studies that have assessed harm to the developing nervous system.⁷ In the case of some health effects, published studies do not offer clear conclusions about effects or the lack of health effects because a sufficient number of relevant studies have not been done. This is particularly true for understanding the

influence of chronic low-level pesticide exposure on neurodevelopment effects and pediatric cancers.⁸

One of the steps in determining potential risk from pesticides is determining the extent of human exposure. Potential exposure routes include ingestion, inhalation, or dermal absorption. The amount, frequency, and duration of the pesticide exposure along with the individual's health and age determine the extent of health impacts. Exposure to pesticides occurs from multiple sources as pesticides enter the body through various routes. It is challenging to predict the extent to which lawn and garden exposures contribute to health effects because these types of pesticides represent only one portion an individual's total pesticide exposure.

Infants, fetuses, children, prospective parents and the elderly may be more susceptible to developing health effects from exposure to pesticides. When considering potential risk from exposure to pesticides, it is important to acknowledge that children are not "little adults." Children and infants exhibit both qualitative and quantitative differences from adults which influence their exposure and susceptibility to pesticides. Factors that impact children and infant exposures' include:⁹

- More time in contact with the ground providing opportunity for hand-to-mouth transfer of residues from the surfaces they touch.
- A breathing zone lower to the ground where some pesticides may accumulate.
- Proportionately more affected by a given amount of pesticide due to smaller size/body weight and different physiology (for example, higher respiratory rate).
- Immature organs and tissues still developing such that effects may be permanent and irreversible.
- A longer lifetime opportunity for cumulative exposure and for health problems to manifest.

There have been a few studies that have assessed children's exposure to lawn and garden pesticides. The following are findings from some of the studies:

- Hand to mouth transfer, dermal absorption and inhalation, following chlorpyrifos application on grass, resulted in exposure to children.¹⁰
- 2,4-D (common lawn herbicide) inadvertently tracked indoors on shoes and feet and persisted longer indoors. Normal mechanisms of degradation are found outdoors. (US EPA's National Exposure Research Laboratory)
- Fat-soluble pesticides, pyrethroids, transferred through breast milk.

Although these studies indicate exposure to the pesticides, the health consequences of these exposures is not known.¹¹

While researchers are cautious in drawing definitive conclusions, epidemiological evidence suggests that there may be moderately elevated risks of reproductive and developmental effects when exposures (occupational or agricultural) to some pesticides (not restricted to lawn and garden pesticides) occur during pre-conception (maternal or paternal), prenatal or postnatal time frames.¹²

- Studies have been conducted to determine if the children can be exposed to pesticides in the womb. Pesticide metabolites found in the meconium may reflect

fetal exposure to pesticides from the second trimester through to delivery. However, additional research is required to evaluate the impact, if any, of this exposure. (Ontario College of Family Physicians (OCFP)).

Researchers also speculate that the elderly may be more vulnerable to effects from pesticide exposure. There is also evidence of a diminished capacity to compensate for impairments caused by toxic exposures in the aging nervous system. This may reflect the impact of early exposures to pesticides or other substances.¹³

A pesticide literature review by the Ontario College of Family Physicians (OCFP) reports summarized studies showing demonstrated or possible links between pesticides and human disease. Significant positive associations have been found between pesticides and the occurrence of some cancers (brain, kidney, prostate, non-Hodgkin's lymphoma and acute lymphocytic leukemia), chromosomal aberrations, and Parkinson's disease. Possible associations have also been found with other cancers (breast, lung, and pancreatic), neurological disorders, reproductive effects (fecundability, fertility, fetal death, birth defects), and neurodevelopmental effects in fetus and children.

Given research methodology, the challenges of population epidemiology and difficulty determining exposure sources, it is reasonable to assume that the health effects of pesticides may never be conclusively determined.

CURRENT LEGISLATION

The Pest Management Regulatory Agency (PMRA) of Health Canada evaluates pesticides for potential adverse effects to humans and the environment using a risk assessment approach. The PMRA follows internationally recognized scientific and regulatory standards to establish levels of exposure that are well below levels determined to have no adverse effects on animals during test studies. The process includes consideration of children's susceptibilities. Based on the results of the assessment, the PMRA registers the pesticide for use.

However, the risk assessment process is constrained by the limits of current scientific understanding and methodology¹⁴, including:

- inability to assess cumulative and interactive effects of active and formulant ingredients of pesticides
- inability to estimate the effects of exposure at different stages of development
- uncertainty regarding exposure estimates (e.g., multiple and diverse exposures, inadequate understanding of dermal exposure in children, persistence of indoor exposures, children's unique exposures in the womb and in breast milk)
- difficulty of predicting the potential long-term effects from chronic, low-level exposure¹⁵
- little research has been conducted regarding non-occupational exposures.¹⁶
- uncertainties associated with extrapolating animal data to human exposure.¹⁷
- epidemiological studies do not examine a particular pesticide but a group of pesticides.¹⁸

Once a pesticide is evaluated by the PMRA, the Ontario Ministry of Environment (MOE) regulates the sale, use, storage, transport, and disposal of pesticides in Ontario through

the Pesticides Act and Regulation 914 (1990). The MOE is also responsible for the certification and licensing of commercial pesticide applicators.

Local municipal governments can pass by-laws, under the Municipal Act, to reduce pesticide use.

PRECAUTIONARY PRINCIPLE

The precautionary principle began as an environmental law principle. It was adopted in international policy statements in 1982 and 1984. The Rio Conference on the Environment in 1992 adopted a principle 'to protect the environment where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'. In 1992, the European Union in the Treaty of Maastricht extended this principle to include human health.¹⁹

In 1998, participants from the United States, Canada, Germany, Britain, and Sweden contributed to the development of the Wingspread Statement on the Precautionary Principle. This statement provides a framework to respond to the use of potentially harmful substances by placing value foremost on human health and ecosystem effects. "It is necessary to implement the Precautionary Principle: When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof." (Wingspread Statement on the Precautionary Principle)

The precautionary principal framework consists of 4 concepts:

- Actions should prevent harm whenever possible.
- Evidence that a new process, technology, activity, or chemical is not harmful lies with the proponents, not with the general public.
- Consideration of a range of alternatives, which include no implementation, prior to the use of a new technology, process, or chemical, or starting a new activity.
- Decisions must be open, informed, democratic and inclusive.

Public health is committed to promoting and protecting health and preventing disease and injury. In the past, public health agencies focused on identifying and reducing or eliminating known health risks. However, when risk factors become more complex and the scientific 'evidence' is not conclusive, "the precautionary principle provides a useful means of guiding public health decisions under conditions of uncertainty."²⁰

PESTICIDE AND PRECAUTIONARY POSITIONS OF ORGANIZATIONS

Many organizations have considered emerging data about pesticides and other environmental contaminants in developing their position statements. Samples of their statements regarding the non-essential use of pesticides and/or the importance of precaution in protecting the population are listed below.

World Health Organization (WHO) on Public Health and the Precautionary Principle
As "modern" potential risk factors become more complex and far-reaching, the precautionary principle... together with related approaches... provides a useful means of guiding public health decisions under conditions of uncertainty..."²¹

Canadian Institute of Child Health (CICH)

“We have repeatedly stated that CICH is in favour of banning the non-essential use of toxic chemical pesticides. While it cannot usually be shown definitely that a particular health outcome is caused by a specific chemical pesticide exposure, the weight of evidence suggest that there is a link between pesticides and a number of conditions including neuro-behavioural problems, endocrine disruption and cancer. No matter how small the risk is, the possibility of it impacting upon the health of children when it is totally avoidable, is unacceptable.” ... “Clearly, this is not only a scientific issue; it is a moral and ethical concern as well.”²²

Canadian Association of Physicians for the Environment (CAPE)

“The primary tenet of the Hippocratic Oath is to do no harm. The medical profession therefore fundamentally endorses a precautionary approach that strives to protect the child when there is profound uncertainty and incomplete understanding of the risks from environmental toxins.”²³

Ontario Public Health Association

“The precautionary principle states that the absence of scientific certainty should not be used as an excuse for inaction where there are potentially serious threats to human and environmental health. There is sufficient suggestive evidence of health and environmental threats from pesticide use to warrant actions to protect the public. In light of this information, there is an important role for public health organizations in advocating for restrictions to the non-essential use of pesticides.”²⁴

Ontario College of Family Physicians (OCFP)

“We need to...inform ourselves: first about high-risk groups in our practices, then about methods to reduce pesticide exposure for women of childbearing age, occupationally exposed patients, and most importantly, children... We can promote the use of the precautionary principle in the area of pesticide use.”²⁵

Toronto Public Health (TPH)

“The methodology and theoretical issues surrounding the human health effects evidence are frequently cited as limiting the ability to draw firm inferences about causality. Acknowledging the weaknesses of epidemiological studies does not detract, however, from the suggestiveness of their findings. The evidence is persuasive that the greater susceptibility of pregnant women and fetuses, infants, children and the elderly justifies the prudent avoidance and precautionary measures to limit unnecessary exposure to pesticides for these vulnerable subpopulations.”²⁶

In summary, these positions and statements reflect a common theme that scientific causal relationships cannot be established and the need for precaution in the face of this uncertainty.

SIMCOE MUSKOKA DISTRICT HEALTH UNIT POSITION

The current knowledge regarding pesticide use and human health exposure and health effects is not complete. It needs to be understood, however, that the data will never be complete. There are serious limitations to risk assessment processes and serious concerns regarding the effects of chronic low level exposure, exposure during vulnerable developmental periods, and potential long-term effects from multiple exposure routes

and sources of pesticides. As stated by the OPHA, “there is sufficient suggestive evidence of health and environmental threats from pesticide use to warrant actions to protect the public.”

In this context, it is prudent, as many organizations have done, to adopt a precautionary approach. In consideration of all of the previously discussed evidence and observations, the following recommendations can guide the direction of the health unit.

The Simcoe Muskoka District Health Units acknowledges that:

- There is ongoing health impact research raising issues regarding the risk of non-essential use of pesticides to human health including acute and chronic health effects.
- Current scientific methods are inadequate to fully assess potential health risks.
- The non-essential use of pesticides does not benefit the health of the population.
- Public health actions focus on preventing illness, protecting and promoting health.
- Many health organizations and bodies endorse the precautionary approach.

Simcoe Muskoka District Health Unit endorses the following strategies regarding the non-essential use of pesticides:

Support residents, businesses, agencies and municipalities to:

- increase awareness and knowledge of the health concerns related to pesticide use
- increase awareness and knowledge of the precautionary principle when considering environmental exposures
- increase their use of alternative non-toxic methods of lawn and garden care
- eliminate their use of non essential pesticides

Support staff to participate in activities that further these outcomes by:

- raising awareness and educating the public about possible health risks of pesticides and the precautionary principle
- participating in community partnerships and coalitions
- supporting policy development
- engaging in advocacy
- participating in research initiatives

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- ¹ OPHA Resolution on the Non-Essential Use of Chemical Pesticides on Public and Private Lands, 2001-02 (RES), Ontario Public Health Association, (2001).
- ² Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 p.22
- ³ Ibid.
- ⁴ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 pgs 30, 31 &35
- ⁵ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 pg.42
- ⁶ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 pg.39
- ⁷ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 pg51
- ⁸ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 pg29
- ⁹ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002 pg18
- ¹⁰ Black R. 1993. B&W R&D CORESTA Agricultural Chemicals Advisory Committee (ACAC)/022. Bates No. 583229823/583229828. Available: <http://legacy.library.ucsf.edu/tid/jcw91d00>
- ¹¹ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002. p.15
- ¹² Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002. pg.42
- ¹³ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002. pg.20
- ¹⁴ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002. pg.9
- ¹⁵ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002. pgs.7-20
- ¹⁶ OPHA Resolution on the Non-Essential Use of Chemical Pesticides on Public and Private Lands, 2001-02 (RES), Ontario Public Health Association, (2001).
- ¹⁷ Ibid.
- ¹⁸ Ibid.

¹⁹ Noseworthy, Dr. L. Overview of Cosmetic Pesticide Use By-Law Issues. Toronto: Haliburton Kawartha Pine Ridge District Health Unit; 2005.

²⁰ Martuzzi M. Ed. Precautionary Principle: Public Health, Protection of Children and Sustainability Background Document. World Health Organization; 2004. p.3

²¹ Ibid.

²² CICH p.1-2

²³ Canadian Association of Physicians for the Environment 2000 p.4

²⁴ OPHA Resolution on the Non-Essential Use of Chemical Pesticides on Public and Private Lands, 2001-02 (RES), Ontario Public Health Association, (2001).

²⁵ Sanborn M. Systematic Review of Pesticide Human Health Effects. Toronto: Ontario College of Family Physicians; 2007.

²⁶ Basrur Dr.S. Lawn and Garden Pesticides: A Review of Human Exposure & Health Effects Research. Toronto: Toronto Public Health; 2002.