Overview of Cosmetic Pesticide Use By-law Issues

Prepared for:

Dr. A. Lynn Noseworthy
Medical Officer of Health
Haliburton Kawartha Pine Ridge District Health Unit
200 Rose Glen Rd.
Port Hope, ON, L1A 3V6

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Prepared by:

Lesbia F. Smith, MD
Environmental & Occupational Health +plus
64 Rathnelly Avenue
Toronto, ON M4V 2M6

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Background to this Document

On October 21, 2004, a delegation consisting of residents from the City of Kawartha Lakes made a presentation to the Board of Health of the Haliburton Kawartha Pine Ridge District Health Unit (HKPR DHU) to express concerns about pesticides and to make enquiries about Health Unit mandates, authority and governance.[1] They posed five questions. Questions A, B, and C were legal issues and therefore were submitted to legal review. Questions D and E referred to the health effects of pesticides. The responses to each are provided in Appendix A[2]. A delegation in November 2004, from the Sustainable Alternatives for Ecological Living Network made a presentation to the Medical Officer of Health (MOH) asking to declare cosmetic use of pesticides a health hazard.

The concerns about cosmetic use of pesticides in the urban setting were presented in the context of the adverse health effects of "pesticides" in general, the application of the precautionary principle in curbing pesticide use, and the use of Medical Officer of Health instruments to assist in this goal – health hazard designation of cosmetic pesticide use or development of a cosmetic pesticide by-law.

Objectives of this Document

As a result of the October 21st meeting, the MOH requested a review of the various perspectives and experiences with by-laws concerning control of the urban cosmetic use of pesticides. This document reviews legal mandates of the Board of Health, mandates for pesticide regulation in Ontario and Canada, current activity of other municipalities in Ontario, and experience of other jurisdictions with cosmetic use of pesticide by-laws where they have been in effect. In reviewing these issues, it is intended that the document will serve to provide information for the Board of Health to move forward with a response to the questions on cosmetic pesticide use within its jurisdiction made by the delegation and to assist the Medical Officer of Health and the Board of Health to respond responsibly to the public, define the roles of the Medical Officer of Health and Health Unit in the issue of cosmetic pesticide use.

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[1] Board of Health meeting minutes; October 21, 2004 delegation from the City of Kawartha Lakes Questions A, B, and C referred to Board of Health governance and mandate.

[2] Board of Health meeting minutes; October 21, 2004 delegation from the City of Kawartha Lakes, Questions C, D, E

Review Process

The HKPR Health Unit Medical Officer of Health provided all documents related to cosmetic pesticides, by-laws, position papers, e-mails, and letters accumulated in Health Unit files. Relevant information from these files was used throughout this review. A web-based search sought additional information from Canada on pesticide regulation, cosmetic pesticide by-laws, cities with by-laws, and experience with by-laws such as rationale, evaluation, costs, implementation, policing and compliance. Case studies were chosen from information presented in web sites and other documents in order to provide examples of experience gained from other jurisdictions. Of these, three case studies were chosen: Kingston, Toronto, and Halifax.

In addition to the above, interviews were sought with key informants involved with this issue in the City of Toronto, in the Ontario Pesticides Advisory Committee, the Ontario Ministry of Health, and Health Canada. Where relevant, the information was included and sources cited.

And last, a scientific literature search (Appendix E) was carried out for key publications in the peer reviewed journals on the PubMed electronic bibliographic database system of the National Library of Medicine of the United States focusing on reviews of health effects of cosmetic use of pesticides as they may relate to pesticide by-laws. The scientific literature search obtained references to review articles on pesticides used in ornamental situations (cosmetic uses), especially those which discussed population health impacts. This search provided an overview of the available literature to complement that provided by existing documents. (A list of documents is in Appendix B.)

Specific reports which have featured prominently in discussions of the issue of urban cosmetic pesticide by-laws were obtained in order to evaluate the kind of information currently used to frame the pesticides issue in policy. Specific reports include the widely publicized and critiqued position paper on the health effects of pesticides posted by the Ontario College of Family Physicians (OCFP)[3] and responses to the OCFP paper by the Crop Protection Association (CPA)[4], as well as by other groups and agencies.

A critical review of the toxicological and epidemiological literature on the health effects of pesticides is outside of the scope of this paper. Only general reference will be made to the potential documented health effects of pesticides for specific populations with appropriate support from the scientific literature. There are also recent (unpublished) reviews of the scientific literature which will be mentioned, among them one by the City

[3] Ontario College of Family Physicians. Systematic review of pesticide human health effects. http://www.ocfp.on.ca/local/files/Communications/Current%20Issues/Pesticides/Final%20Paper%2023APR2004.pdf

[4] Cantox Health Sciences International. Safety Evaluation of Pesticides – An Analysis of the Ontario College of Family Physicians Pesticide Literature Review. Prepared for Crop Life Canada. November 12, 2004.

of Toronto from April 2002[5] and the "systematic review" of pesticide health effects done for the Ontario College of Family Physicians in 2004[6].

Literature Overview

Individual exposure to any pesticide can occur in occupational or residential settings; accidental exposure can occur in the context of transport accidents and by accidental ingestion. Deliberate poisoning can also occur in any setting. The degree to which exposure occurs will determine if the episode is characterized as a poisoning. These situations vary considerably from population exposure or from persons at risk of exposure, when pesticides are used as intended. The evidence of actual health risk to the population overall is reiterated in recent reviews in peer-reviewed publications on this topic and in the City of Toronto 2002 review of the topic, which states in its summary:

"The methodological 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 exposures to pesticides for these vulnerable subpopulations."

This translates into the failure of the published literature to support unequivocally either population harm or safety for pesticides under normal conditions of use. And further, with ambiguous interpretation of the literature, the paper concludes to limit "unnecessary exposures". "Unnecessary" is not defined.

The Canadian Cancer Society (April 2002) published its comments on ornamental use of pesticides. They state:

"Since ornamental use of pesticides has no countervailing health benefit, we call for a ban on the use of any pesticide for ornamental purposes that has not been scientifically demonstrated to be non-carcinogenic."

Other evidence indicates that some safety factors taken into consideration in the process of pesticide licensing may not be sufficient to protect susceptible sub-populations under certain conditions of exposure. The regulatory bodies espouse the premise that protection of susceptible sub-populations can be managed with current legislation, and specific risk-reduction strategies. Other groups would disagree with the conclusion of regulatory bodies and frame the issue within the context that exposure to susceptible groups cannot be controlled effectively by current use patterns, and that the precautionary principle of prudent avoidance should be invoked. No convincing evidence has been presented that

[5] City of Toronto. Lawn and Garden Pesticides: A review of human exposure and health effects research. April 2002.
[6] Op cit (3)

cosmetic use *per se* provides a level of exposure to the population as a whole to warrant concern. However, as the City of Toronto has demonstrated, lawn pesticide residues have been found in surface waters within the city at levels which sometimes exceed environmental standards.[7] Those found are the most commonly used pesticides in gardens and lawns (Mecopropp -MCPP, 2,4 D, Dicamba, Diazinon, and MCPA). That alone may warrant more discretion in their use under the aegis of environmental protection, even if the human exposure and health issue remains under scrutiny.

The City of Toronto has promoted the use of the precautionary principle and prudent avoidance in its strategies of public awareness about pesticide uses around the home and in the garden, in addition to its by-law initiative. However, its by-law appears to be supported by stronger evidence of environmental protection rather than for demonstrated population health effects.

The Precautionary Principle

The precautionary principle has its beginnings in the "foresight principle", which emerged in the 1970s and was developed as a principle of environmental law. It was part of the international policy statements and agreements recognized in the World Charter for Nature, which was adopted by the UN General Assembly in 1982; and subsequently adopted in the First International Conference on Protection of the North Sea in 1984. Its initial intentions were to protect the natural environment and especially to protect marine life. In 1992, at the Rio Conference on the Environment, Principle 15 was adopted, advocating the widespread international application of the precautionary principle. Principle 15 states that: 'In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.' The European Union in the Treaty of Maastricht in 1992 extended the principle from environment to human health. [8]

In Canada, this precautionary principle has been promoted further after the Wingspread[9] Conference in Racine, Wisconsin in 1998. It took on a more political tone by advocating that the onus of proof (of safety) be put on the proponent of an environmental intervention rather than on the public. But the advocates seasoned the "precautionary" process by stating that its application had to be "…open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full

[7] City of Toronto, Proposed Pesticide By-law, Report to Council May 21,22,23, 2005, page 28

[8] Helene Guldberg. Challenging the precautionary principle. How has society come to be governed by the maxim 'better safe than sorry'? http://www.spiked-online.com/

[9] The home of Herbert Fisk Johnson, grandson of the founder of SC Johnson & Son, Inc., designed and built by the famous American architect Frank Lloyd Wright. It was willed as an educational facility and conference space when the family moved out in 1959. It has been used for that purpose since 1982.

range of alternatives, including no action." One extreme of this principle evolved into the principle of “prudent avoidance”.

Prudent Avoidance

The term ‘prudent avoidance’ arises as a corollary to the precautionary principle applied to human health promotion, an extension from its original application to environmental protection and as promoted by the health advocacy delegates to the 1998 Wingspread Conference.[10] It is minted in the expression, “better safe than sorry.” In summary, precaution and prudence guide action in environmental and health regulation when there is lack of certainty in knowledge.

Regulation and the Precautionary Principle

The regulatory processes which have been entrenched in developed countries since the 1970s use risk analysis (risk assessment and risk management) to reflect this lack of certainty in absolute knowledge. The process of risk assessment was established specifically to act in the absence of full information on the health effects of low dose exposures and consideration of special and susceptible groups, by using concepts of toxicology such as potential carcinogenicity, threshold and non-threshold effects, maximum exposure scenarios, and by the use of safety factors (or uncertainty factors) to compensate for this lack of absolute knowledge. Precaution and prudence are not terms used in risk assessment which is the scientific framework for environmental and health regulations. While environmentalists refer to precaution and prudence, risk assessors and regulators talk of risk management in the face of uncertainty, uncertainty analysis, and taking action in the face of uncertainty. The language is similar.

A philosophical issue concerns knowledge itself. The scientific method espouses the concept that absolute knowledge is not possible, and that challenges can always be made to existing beliefs as new information arises. This principle is difficult to apply, if as a result of absolute prevention (meaning no exposure ever), no new knowledge arises to understand natural principles and the nature of risk.

But three concepts stated from resolutions at the Wingspread Conference can be considered as well. One is that the precautionary principle is “*democratic*”, implying requiring stakeholder consultation. Another is that it should be applied *“…according to capabilities*”, meaning that sometimes it is not possible to achieve. The third concept is that options should include “*…an examination of the full range of alternatives, including no action”,* meaning that it is best to leave things alone. This implies that some quantitative cost-benefit analysis must be considered when examining its application in specific circumstances. When viewed in the light of these clarifications, many scientists

[10] Wingspread Conference 1998, op cit.

consider risk assessment in its intentions as currently practiced as remarkably similar to the precautionary principle and prudent avoidance. [10,11]

Several examples of the successful incorporation of value systems into risk assessment through the examination of all options are presented as case studies in the literature. A full discussion of these is outside the scope of this report. Nonetheless, it is important to know that risk assessment as a process is used to implement concepts of precaution in the absence of complete knowledge about a chemical[12] while also using accepted factual information.

Program Standard of the Mandatory Health Programs and Services Guidelines

The Board of Health's authority is derived from the Health Protection and Promotion Act, R.S.O., 1990 Chapter H.7. As the Board of Health's authority is derived from provincial legislation, its mandate, objectives and goals are based upon that provincial legislation. The Ministry of Health and Long Term Care (MOHLTC) is also mandated to issue standards and guidelines for Boards of Health (i.e. Mandatory Health Programs and Services Guidelines). Programs implemented in health departments as a consequence of these mandatory guidelines are funded in part by the MOHLTC (see cost-sharing, below). The Mandatory Health Program Standard called Health Hazard Investigation is one of these mandatory programs (See Appendix C for details). The intention of this standard is to have all health departments provide services defined as minimum in order to "… prevent or reduce adverse health outcomes resulting from exposure to health hazards* as defined in the HPPA and including biological, physical, and chemical agents, natural or manmade". This standard requires the Board of Health to identify, investigate, manage health hazards; educate, promote, monitor programs, respond to complaints in a timely fashion, and document and report appropriately. The identification process is "proactive," while the investigative response process is "reactive".

Legal interpretation of "*Health Hazard*"

The legal interpretation of health hazard has been provided by legal counsel to the HKPR DHU:

"A health hazard is restrictively defined to mean a condition of a premises, a substance , thing, plant or animal, other than man, or a solid, liquid, gas or combination of any them, but only if it 'has or is likely to have an adverse effect on the health of any person.' The MOH is further limited to responding to circumstances where she is of the opinion, on 'reasonable and probable grounds', that a health hazard exists, and that the requirements

[10] Tuomisto J. Is the precautionary principle used to cover up ignorance? Annotations and Reflections. Basic & Clinical Pharmacology & Toxicology 2004;95:49-52
[11] Farrow S. Using Risk Assessment, Benefit-Cost Analysis, and Real Options to Implement a Precautionary Principle. Risk Analysis 2004;24:727-735
[12] Farrow S. op cit

in a prospective order are necessary to decrease or eliminate the health hazard. The requirement that the MOH have "reasonable and probable grounds" to believe a health hazard exists is a high standard of both objective certainty and imminent concern. The order must be directed to a specific person, with the corollary that what that person must proceed to do will decrease or eliminate the health hazard. The pre-conditions to issuance of such an order are narrow."[13]

A challenge to this interpretation of "health hazard" for a specific case of individual susceptibility was made in 1994. A specific interpretation of what constitutes a health hazard was provided by the divisional court of Ontario in 1994.[14] The important point in the interpretation of the meaning of "any person" rests with whether "*any*" person means "*all persons*" or "*even one*" person. The judge interpreted *"any person"* to be that a health hazard is not peculiar to an individual person, but rather to the "community" or every person in the community, as it is part of "community health protection", and therefore does not include "*any*" individual idiosyncrasies. The judge adds that individual idiosyncrasies should be addressed by a personal physician.

Cost Sharing

The Mandatory Programs are funded jointly by the MOHLTC and the municipalities. Current cost sharing is being stepped up from its current 55/45 percent (provincial/municipal) share up to 75/25 percent in fiscal year 2007. Mandatory programs funding has not been specifically earmarked to a program in recent years, as global budgeting was in force. However, current funding from MOHLTC as of fiscal year 2005 is program based ("program-based budgeting") and does not specifically fund implementation of a municipal cosmetic pesticides by-law.[15]

The MOHLTC's Public Health Branch current practices with respect to cosmetic pesticide use reflects those espoused by regulatory agencies such as Integrated Pest Management promoted by the Pesticide Management Regulatory Agency (PMRA), the Healthy Lawns Strategy promoted by Health Canada, and general principles that registered pesticides should be used as regulated. The MOHLTC Public Health Branch considers the development of municipal pesticide by-laws as a local politically-driven issue to be decided locally. There is no indication that any existing program is specifically funded in whole or in part by the MOHLTC or that there is any intention of doing so.

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* Health hazard means: a) a condition of a premises; b) a substance, thing, plant or animal other than man; c) a solid, liquid, gas or combination of any of them, that has or that is likely to have an adverse effect on the health of any person. (Health Protection and Promotion Act)

[13] Interpretation provided by HKPR DHU counsel, April 20, 2005.
[14] Bracey vs. Kendall et al. December 15, 1994. File no 788/94 (Unreported decision of the Divisional Court)
[15] Personal communication, MOHLTC Public Health Branch Administrative and Program Staff. April 8, 2005.

Pesticide Regulation in Canada and Ontario

Pesticide uses in Canada are regulated at three levels depicted in Table 1 (see below). The Pest Management Regulatory Agency manages the approvals, uses, evaluations, and regulation of pesticides in Canada. Approvals are based on information provided by the manufacturer and evaluated by scientists within Health Canada. International pressures to compete with exported and imported crops, and to maintain international residue limits are important considerations at this level. Notwithstanding, health protection and environmental safety, as well as efficacy, are the espoused criteria which must be met for registration.

Provinces then fine tune the uses, according to their needs, environmental considerations, and ability to monitor use. Ontario manages its pesticide uses though its own infrastructure within the Ministry of the Environment (MOE). The province regulates sales, storage and disposal; training and licensing of applicators and vendors; use permits, and compliance monitoring and enforcement.

Table 1: Principal responsibilities by jurisdiction

Federal (Pest Management Regulatory Agency of Health Canada)	**Provincial/Territorial**	**Municipal**
• Pest Control Products Act (PCP Act) and Regulations • Pesticide registration and re-evaluation • Human health and safety • Environmental impact • Value (including efficacy) assessment • Alternative strategies • Compliance and enforcement	• Transportation, sale, use, storage and disposal • Training, certification and licensing of applicators and vendors • Spills and accidents • Permits and use restrictions • Compliance and enforcement	• By-laws for municipal, and, in some cases, private and residential lands

Source: Pest Management Regulatory Agency, *Fact Sheet on the Regulation of Pesticides in Canada*, March 2003.

Classes of Pesticides according to targets (weeds, insects and fungi) and chemical class

The different classes of pesticides are listed in Table 2, which follows. These chemical classes can also be divided into groups exerting biological and toxicological actions. For example, organophosphates and carbamates are nerve toxins (cholinesterase inhibitors), while 2,4 D is a plant growth regulator, and Bacillus thuringiensis (Bt) is a biological agent, a bacterium, which parasitizes its target and produces a toxin within it to effect harm or death to the target.

Table 2: Commonly used pesticides classified by function and chemical class.

Functional Group	Chemical class
Herbicides	• Phenoxy acetic acid • Phenoxy benzoic acid • Thiocarbamates • Thiazines • Anilides • Dipyridyl compounds • Phosphonates
Insecticides	• Organophosphates • Organochlorines • Carbamates • Pyrethroids • Rotenoids
Fungicides	• Thiophthalimides • Thiocarbamates • Ethylene bisdithiocarbamates

Source: Adapted from: Alavanja, MCR, Hoppin, JA, and Kamel, F. Health Effects of Chronic Pesticide Exposure: Cancer and Neurotoxicity, Annu. Rev. Public Health 2004. 25:155-97.

The toxicological properties of each group of pesticides differ from one another, and so do the expected health effects. No group of pesticides should be treated as toxicologically identical to another. Similarly, environmental fate, toxicity, and other target effects vary considerably from group to group, and for individual formulations within each group. Because of this diversity within the term “pesticides”, studies which examine a general term “pesticide” as an exposure measure have little merit in singling out the specific potential effects of single agents.

A list of commonly used pesticides in lawn care is in Appendix H.

Framing the Pesticides By-law Issue

Stakeholders involved in pesticides issues on the side of municipal control of cosmetic uses have framed their positions in a number of ways: protection of the most susceptible (children and the elderly), children's health issues (potential developmental and neurotoxic effects), women's health issues (potential reproductive and cancer risks), the environmentally sensitive (special groups purported to be sensitive to extremely low doses of many chemicals), the precautionary principle and prudent avoidance, ecosystem effects and sustainability (environmental protection from pesticide runoff), and others.

Stakeholders involved in pesticides issues on the side of risk assessment based on a scientific weight of evidence approach include government agencies (health and environment, regulatory). More recently, an approach has been developed to the management of health risks, pesticides in particular. This approach includes greater participation of interested stakeholders so that legislation reflects values and perceptions to an equal or greater extent than scientific weight of evidence, especially in areas where information of health effects may be scant or derivative of experimental animal studies and models instead of human experience. In addition, much more emphasis appears to be given to the assumption that if there is not enough evidence to demonstrate definite health risks under conditions of use of a particular chemical, the practice should be avoidance of the use of a chemical altogether, under the aegis of the precautionary principle.

As examples of the extreme views of this issue, there are two reports: one by the Ontario College of Family Physicians[16] and the other a Report of a Panel on the Relationship between Public Exposure to Pesticides and Cancer by the Ad Hoc Panel on Pesticides and Cancer, from the National Cancer Institute of Canada.[17] The former documents health effects possible from "pesticides" and makes no reference to the value of risk management, while the latter focuses exclusively on risk assessment of specific pesticides uses and risk management, and not on uncertainties of the scientific data and stakeholder values.

The OCFP report is a structured review of published papers on the health effects of pesticides. It used a priori criteria to select papers from a thorough search of publication. The papers found were then subjected to other criteria on methods for more detailed analysis and comment. Papers which showed positive effects were selected. A systematic review would have included all well conducted studies, even if they did not show positive results. Then, all studies taken together would have been used to produce a weight-of-evidence conclusion. The OCFP review was selective in choosing only positive studies, thus resulting in biased conclusions.

The OCFP Report recommendations are measured, however. They recommend specifically that family physicians be more aware about the health effects of pesticides in

[16] op cit. (3)
[17] Ritter L. Report of a panel on the relationship between public exposure to pesticides and cancer. Ad Hoc Panel on Pesticides and Cancer. National Cancer Institute of Canada. Canadian Network of Toxicology Centres, Guelph, Ontario, Canada. Cancer. 1997 Nov 15;80(10):2019-33.

the general population, that they take good exposure histories, and that they include the possibility of pesticide effects among the differential diagnoses of patients with nonspecific symptomatology. While this recommendation is valid, it does not speak to regulatory issues. Furthermore, it does not consider the current studies of population exposure measures which use biological urine measures of exposure. When using these measures, they demonstrate that pesticide residues in adult populations are well below toxicological benchmarks. For example:

"Given the possibility of a subject's dietary intake of a pesticide's metabolites incorporated into treated food, our results show that few, if any, individuals in the general US population aged 20-59 years and not employed in pesticide application were likely to have exceeded the USEPA RfD for these parent compounds during the years studied."[18]

Studies of children in agricultural settings that use biological measures of exposure (urinary pesticides or metabolites) show that children may exceed the toxicological *reference dose* for some pesticides (e.g. azinphosmethyl), but not the *no observable effect levels*.[19] These studies argue that exposure may occur, but at extremely low levels unlikely to have toxicological significance.

A full review of the studies which assess overall dietary and non-dietary exposure to garden pesticides is beyond the scope of this overview. However, it must be noted that the evidence in support of exposure from food and environmental pesticides in general has been used selectively to support a precautionary principle for cosmetic pesticides use. Total exposure is primarily from foods in the marketplace, so that cosmetic / ornamental pesticide uses provide very little added exposure compared to exposure from other sources such as food residues.

A recent publication by the US Centers for Disease Control and Prevention (CDC) provides case definitions of poisoning, including poisoning due to certain pesticides. The CDC also provides an algorithm for diagnosis, including signs, symptoms, and clinical tests for confirmation. For example, the CDC provides guidance for the diagnosis of organophosphate pesticide poisoning, which should help practitioners considerably in making a diagnosis of that exposure. The document also provides a framework upon which to make other exposure assessments to diagnose chemical poisoning.[20]

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[18] Mage DT, Allen RH, Gondy G, Smith W, Barr DB, Needham LL.Estimating pesticide dose from urinary pesticide concentration data by creatinine correction in the Third National Health and Nutrition Examination Survey (NHANES-III). J Expo Anal Environ Epidemiol. 2004 Nov;14(6):457-65.

[19] Fenske RA, Kissel JC, Lu C, Kalman DA, Simcox NJ, Allen EH, Keifer MC. Biologically based pesticide dose estimates for children in an agricultural community. Environ Health Perspect. 2000 Jun;108(6):515-20

[20] Belson, MG, Schier J, Patel MM. Case Definitions for Chemical Poisoning. Recommendations and Reports. January 14, 2005. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5401a1.htm

Municipal Responses to Pesticide Issues

In the climate of polarized views, municipal control of pesticide uses has emerged in the arena as representing more stakeholder control. As a result of the recent surge of municipal pesticide by-law development, and the support received from the courts as to the rights of municipalities to pass such by-laws, health departments need to find a comfortable niche to respond appropriately according to the specific circumstances of their jurisdiction. To quote the Pesticide Management Regulatory Agency:

> *"Municipalities have the authority to protect the health and safety of residents and to legislate nuisances through by-laws. Municipal authority to regulate pesticides is determined by provincial legislation, such as the Municipalities [*sic Municipal*] Act. Because the legislation varies among provinces, the legal status of the application of municipal pesticide to private land is not clear. On June 28, 2001, the Supreme Court of Canada upheld a by-law passed by the town of Hudson, Quebec, that banned the cosmetic use of pesticides within municipal boundaries, including on private property. This will likely set a precedent for future development and action concerning pesticide regulation at all levels of government.*[21]

Ontario municipalities will continue to be able to pass municipal by-laws dealing with pesticides under the proposed new Bill 111 in accordance with the Supreme Court decision.[22] The Supreme Court of Canada's decision in Hudson vs. Spraytech clearly provides municipalities the right to pass by-laws banning or restricting the use of chemical pesticides within designated areas. Ontario had a number of cities already which have passed by-laws affecting the use of pesticides within the realm of "cosmetic use". The list of Ontario cities is among a growing number in Canada to have passed or to be currently considering municipal by-laws to control cosmetic pesticide uses (see Appendix F).

Five of these Ontario cities have framed the law in different ways, from a language of regulatory control ("ban pesticides") to one of information and cooperation for a specific goal (Healthy Horticultural Landscapes). Although many by-laws are modeled after the Town of Hudson, Quebec by-law, they vary considerably from each other, taking into consideration local interests, abilities to implement, costs, and stakeholder preferences, among other considerations.

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[21] Responsible Pest Management http://pestinfo.ca/main/ns/8/doc/25/lang/EN

[22] Theresa McClenaghan. November 2000. Bill 111, An Act to Revise the Municipal Act: A Comment by CELA Regarding the Potential Impact on the Decision of the Supreme Court of Canada Regarding Municipal Pesticide By-laws CELA Bulletin http://62.44.8.131/publications/cardfile.shtml?x=971

The City of Toronto By-Law was challenged by the Ontario Crop Protection Association. The challenge resulted in the City of Toronto (as a municipality) supported by the courts as having the right to issue by-laws. This was established by the Hudson, Quebec, precedent (see above). This decision to the challenge has been appealed, hearings have been held, and a decision on the appeal is awaited. No decision on the appeal has come forward as of April 2005.

Case Studies (See Also Appendix D)

Three case studies have been selected for this review. These cases were selected based on different stages of pesticide by-law consideration and implementation. The three cases are as follows:

- City of Kingston; http://www.cityofkingston.ca/residents/environment/pesticides.asp
- City of Toronto; http://www.city.toronto.on.ca/pesticides/

and,

- City of Halifax. http://www.halifax.ca/legislation/bylaws/hrm/blp-800.pdf

The City of Kingston is in the process of implementing a pesticide by-law. The City of Toronto has recently implemented a pesticide by-law in 2004. Finally, the City of Halifax has pesticide by-law initiated in 2001 and fully implemented in 2003

Case Study 1: City of Kingston

(http://www.cityofkingston.ca/residents/environment/pesticides.asp)

Background:

- Report to Council was presented documenting potential strategies for reducing cosmetic pesticide use (Report No. 03-120)
- Four Options were presented to Council

Current Pesticide Use in the City of Kingston:

- Outdoor insect control
- Indoor insect control
- Wood preservatives
- Anti-fouling for boats/vessels
- Control of micro-organisms and algae within swimming pools and ornamental ponds
- Control of micro-organisms within water used for potable purposes
- Flea control on pets and other animals
- Aquatic weed control in harbours
- Insect repellents applied to the skin of people and animals
- Cosmetic control of weeds and insects for lawn and garden care

- Control of interfering plants along utility and trail corridors
- Cosmetic improvement of residential lawns.

Option 1: Lobby Other Government to Take Action

Rationale:

- Federal and provincial government have greater ability to fund inspection and enforcement of any regulatory measures
- Federal and provincial government have more expertise required to deal with the scientific issues surrounding pesticide use

Option 2: Undertake Public Awareness & Education Campaign

Rationale:

- Reduce or elimination of pesticide use on private lands will not be successful without public education and awareness

Option 3: Create By-Law Requiring Integrated Pest Management on Public & Private Lands

Rationale:

- Lawn care industry has moved toward the voluntary adoption of an Integrated Pest Management approach
- A professional organization (IPM-PHC) has been created to provide IPM accreditation to qualified firms
- City of Kingston may consider a policy that requires pesticide application on private properties to be undertaken only by IPM-accredited firms

Option 4: Create By-Law Restricting Cosmetic Pesticide Use

Rationale:

- May be effective in reducing pesticide use
- By-law provide clear direction on which pesticide could and could not be used, where, when and by whom

Case Study 2: City of Toronto

(http://www.city.toronto.on.ca/pesticides/)

Background:

- September to October 2002, public opinion poll was conducted to determine the level of public support to reduction in pesticide use in the City of Toronto
- Survey showed 86% of respondents favored reduction of pesticide use, 72% supported a by-law restricting use of pesticide on private property, 8% opposed to pesticide use reduction
- May 2003, Toronto City Council passed By-law 456-2003
- April 1, 2004, Pesticide By-law restricting the use of pesticides on public and private property comes into force

Characteristics of By-Law 456-2003:

- By-law Enforcement (with warnings, fines, and search warrants when necessary)
- Communication, Education & Awareness
- List of banned and permitted pesticides

Affected Properties:

- No person shall apply or cause or permit the application of pesticides within the boundaries of the City.

Exemptions:

- To disinfect swimming pools, whirlpools, spas or wading pools;
- To purify water intended for the use of humans or animals;
- Within an enclosed building;
- To control termites;
- To control or destroy a health hazard;
- To control or destroy pests which have caused infestation to property;
- To exterminate or repel rodents;
- As a wood preservative;
- As an insecticide bait which is enclosed by the manufacturer in a plastic or metal container that has been made in a way that prevents or minimizes access to the bait by humans and pets;
- For injection into trees, stumps or wooden poles;
- To comply with the *Weed Control Act* and the regulations made thereunder; or
- As an insect repellent for personal use.

Special considerations are currently being reviewed for:

- Golf courses;
- Lawn bowling greens;
- Cemeteries.

Cost Associated with Pesticide By-law:

Estimated budget for implementation of by-law for 2004 was $450,000 broken-down as follows:

Staff (4 public health inspectors, 1 clerk, 2 helpline)	$ 221,359
Supplies and Equipment	$22,640
Mileage	$7,000
Plant Health Expert	$12,000
Production and Design	$10,000
Advertising	$150,000
Conference/workshop	$13,000
Printing	$ 12,000
Postage	$ 2,000

Criteria for Evaluating the Effectiveness of the Pesticide By-law:

- Education (community education session, booklets produced, website hits etc)
- Enforcement (number of calls/complaints, Number of public health inspector inspections, number of warnings/tickets/search warrant issued)
- Short-term results (proportion of residents aware of by-law, ratio of complaints to tickets, percent change in proportion of Toronto residents using non-chemical/organic lawn care company
- Long-term impact (measures level of pesticide by-products in Toronto streams and soil)

Case Study 3: City of Halifax[23]

(***http://www.halifax.ca/legislation/bylaws/hrm/blp-800.pdf***)

Background:

- Discussion began in 1997 when a Regional Councilor raised a question at Council on behalf of his constituents regarding regulating "toxic" products.
- In the spring of 1999 the Province granted authority to Halifax Regional Municipality (HRM) to regulate pesticide use within the municipality, with the enabling legislation specific to residential property and property owned by the Municipality.
- In December of 1999, reports were forwarded to Regional Council on consensus and non-consensus items regarding restriction of pesticide use
- After a lengthy and open public process, By-Law P-800, Respecting the Regulation of Pesticides, Herbicides and Insecticides, became effective August 19, 2000.

Characteristics of By-Law P-800:

Year 1 (2000/01): Ban on cosmetic use of pesticides on municipal property and commencement of public awareness programs.

Years 2 & 3 (2001/ 02): Commencing April 1, 2001, a ban on cosmetic use of pesticides on residential properties located within a 50 metre radius of:

- a property registered as being occupied by persons at risk who provide medical documentation;
- the boundary of any property containing any schools, licensed daycare, playground, park, church, licensed seniors' residence, university or hospital.

Year 4 (2003): Commencing April 1, 2003, a general ban on the cosmetic use of pesticides would apply to all properties in HRM affected by the By-law.

Components of By-Law P-800:

- By-law Enforcement
- Communication, Education & Awareness
- Pesticide Permits & Data
- Research, Partnerships
- Data Management
- Pesticide Permit Application

[23] Sources: Halifax Regional Municipality, 2004 Program Overview Pesticide By-Law P-800 Respecting the Regulation of Pesticides, Herbicides, and Insecticides, December 2004.

Affected Properties:

- Property owned by the Municipality
- All or part of property which lies within a 50 meter radius measured from the boundary of a property containing any school, licensed daycare centre, park, playground, licensed senior citizens' residence, university, church or hospital.

Exceptions:

- Pesticide application to control plants or insects when it constitutes a danger to human beings

Costs Associated with Pesticide By-law[24]

- $0.50-$1.00 per person per year for by-law implementation
- $0.13-$0.24 per person per year for outreach programs
- Overall, total pesticide-use reduction initiative cost approximately $0.60 per person
- Council allocated $200,000 for by-law start up and roll out cost in 2000-2001
- Implementation of by-law: $210,000 in 2001-2002
- In 2002-2003 the budget was as follows:

Public Education and Awareness	$ 40,000
Communications Plan, Advertising, Promotion, etc.	$ 40,000
Research, Education and Related	$ 5,000
Permit Review Process and Education Program	$ 35,000
Administration, Support and Related	$ 45,000
By-law Enforcement	$ 32,000
Total estimated budget	$197,000

Indicators of Progress:

- Number of permits requested decreased
- Number of permits granted decreased
- In 2001, 7% still used pesticides as their main method of weed and pest control, 90% used pesticide alternatives

[24] http://www.toolsofchange.com/English/CaseStudies/default.asp?ID=1

Summary of municipal experience with by-laws

The City of Toronto commissioned a review of cosmetic pesticide by-laws throughout Canada (March 2004).[25] The review points out in its conclusions that:

> "By-laws / laws have achieved greater reductions in pesticide use than education programs alone. All of the communities that have reached a high level of reduction have had a by-law in place and/or a community-wide decision to reduce pesticide use."

However, it must be noted that each geographic area has unique challenges in making a by-law work, and that a by-law may not be able to achieve significant reductions because of the particular composition of its land uses. In order to design a program to achieve a stated goal of reduction of specific focused uses such as cosmetic uses, the Best Practices Review Document also outlines a process to determine what might work best for a particular site. The process is outlined below. A complete list of the conclusions and recommendations of the Best Practices Document is in Appendix G. In summary, the report suggests this list as generic best practices.

Best Practices:

- Establish baseline information in order to measure change.
- Engage residents in the process
- By-laws / Legislation supported with public education result in greater reduction in residential pesticide use than education programs alone.
- The by-law is only as good as its enforcement/education and permitting systems.
- The by-law provisions should be designed to accommodate changing products.
- Municipal efforts benefit from provincial and federal efforts.

[25] The Impact of By-laws and Public Education Programs on Reducing the Cosmetic / Non-Essential, Residential Use of Pesticides: A Best Practices Review. C2P2 and Cullbridge. March 15, 2004.

Characteristics of HKPR DHU Area

Municipalities and Population

An overview of land uses in HKPR DHU may give some insight on what might be considered with a view to cosmetic pesticide reduction. With regard to population and municipal jurisdictions, the HKPR DHU area includes three upper-tier and eleven lower-tier municipalities, listed in the table below:

County	Municipality
Haliburton County	Algonquin Highlands
	Dysert et al
	Highlands East
	Minden Hills
City of Kawartha Lakes	
Northumberland County	Alnwick/Haldimand
	Brighton
	Cobourg
	Hamilton
	Port Hope
	Trent Hills
	Cramahe

The population of the entire HKPR is 173,920, with Northumberland County having 83,315; City of Kawartha Lakes having 74,307; and Haliburton County having a population of 16,298 (PHPDB, MOHLTC Health Planning, Download April, 2005)

Land uses: Farmlands

According to data from the Ministry of Agriculture and Food, approximately 30% of all land in HKPR DHU is farmland (Haliburton: 2% farmland; City of Kawartha Lakes: 53% farmland; and Northumberland: 54% farmland). The actual acreage is in the table below.

County	Total no. of farms	Total area of farms (acres)
Haliburton	69	13,976
City of Kawartha Lakes	1,516	360,690
Northumberland	1,104	253,665

Source: 2001 Census of Agriculture and Policy & Programs Branch, OMAF

The types of crops grown the HKPR area are as follows:

- Major field crops - wheat, oats, corn, hay, soybean, potatoes and barley.
- Major fruit crops - apples, peaches, sour cherries, raspberries, strawberries, and grapes.
- Major vegetable crops - sweet corn, tomatoes, green peas, and green beans.

Land uses: Golf courses

Golf courses are known to be high users of weed control herbicides to maintain turf. There are some 24 such courses in the areas; 11 in the City of Kawartha Lakes, 11 in Northumberland County, and two in Haliburton County.

Land uses: Residential and other properties

Pesticide by-laws generally apply to residential properties and to municipal parks and selected other properties. For example, Port Hope has 6,125 residential properties to which a by-law might apply. Daycare centers and long-term care facilities which have been considered as pesticide-exclusion zones under some pesticide by-laws are few in number. In the three counties, there are only 26 daycare centers and 18 long-term care facilities.

Summary of land use and considerations for by-law development

Any municipal pesticide by-law must be sensitive to the special needs of farmland, golf courses, the location of "sensitive populations", and the number of private and public premises which might be affected, as well as exceptions for use of pesticides in emergency situations ("notwithstanding exceptions"). The HHKPR DHU area is diverse, but a major portion of its land is used for farming, which is likely to use the licensed pesticides for usual crops unless the land is used for organic farming with limited synthetic pesticide use. Golf courses are usually excluded from pesticide by-laws but may be amenable to reducing pesticide use by implementing integrated pest management. There are also many rights of way for hydroelectric lines which are usually also excluded from a cosmetic pesticide by-law.

Potential Choices for Positive Action by the HKPR District Health Unit

Important considerations in making a choice as to what tools to employ to encourage pesticide-use reduction include land uses, potential for meaningful reductions in residential cosmetic pesticide use, amount of public support, and willingness to pay. Experience gathered from other jurisdictions can also assist in framing actions which can be taken.

Information obtained on some characteristics of the HKPR DHU geographic area refers to population, open space, spaces which may be affected as included or excluded, farming area, dwellings and premises in urban areas which could be affected, etc. This information, as well as the findings in the Case Studies, the best practices compendia, and the Mandatory Programs philosophy can all assist in developing the most appropriate course of action to move forward.

As a means of exploring next steps to move forward, the HKPR DHU can undertake a number of activities in response to public demands to involve it in this issue. These activities have been delineated in the options below. They reflect a full range of action to respond to the delegations and submissions which have been presented to the Medical Officer of Health, and to be coherent with current HKPR DHU mandates, philosophy, and capacity.

Options

The options that follow present a menu of potential actions for the HKPR DHU to consider. They represent actions which are feasible and timely.

Option 1: Status Quo

Inform the Board of Health of current status of pesticide by-law issues in the province, public health priorities for the Health Unit, and potential costs of implementing a by-law (which are not cost-shared by the province).[26]

Objectives:
This option would inform the Board on how to proceed and consider additional options for action in the future.

Option 2: Develop a program to promote current activities supported by the MOHLTC Public Health Branch

A. Promote Integrated Pest Management Practices within municipal properties and in residential, school, daycare, and health care facilities premises.
B. Promote Healthy Lawns Strategy

Objectives:
This option uses current tools to encourage decreasing use of pesticides in all circumstances, and is concordant with direction from the MOHLTC.

[26] According to City of Toronto publications, expected funding from the province was 50%. However, the Province advises that this is not the practice with program based budgeting.

Option 3: Examine current practices and current support for a pesticide by-law or any other action.

This may be done through the established public health tools such as the Rapid Risk Factor Survey Surveillance System (RRFSS http://www.cehip.org/rrfss/) which is within the scope of funded public health activities.

Objectives:
This option provides the opportunity to explore these questions throughout the district and to make informed decisions on the merits of such a by-law or alternatives. It will also point to areas requiring further stakeholder consultation.

The RRFSS can add a component on pesticides to its questionnaire. RRFSS is limited in that is can only do a 1,200-person sample per Health Unit per year. Such a sample size can only capture a limited range of opinion in each municipal tier. Results may not reflect opinions or values in all areas. Municipalities, however, can proceed with more representative sample sizes in their own surveys if they wish.

Appendices

Overview of Cosmetic Pesticide Use By-law Issues
Appendices

April 21, 2005

Appendix A:

Questions posed to the Board of Health during a deputation to the Board on October 21, 2004 and responses:

A. What is the Board of Health's authority and power to represent the people of your jurisdiction?

The Board of Health's authority is derived from the Health Protection and Promotion Act, R.S.O., 1990 Chapter H.7.

B. To what extent is the Board of Health obliged to follow the dictates of the province?

As the Board of Health's authority is derived from Provincial legislation, its mandate, objectives and goals are based upon that Provincial legislation.

C. What is the schedule of Board of Health meetings and what areas does the Board of Health represent?

The Board of Health usually meets monthly between September and June, on the third Thursday of the month. The Board of Health oversees the Haliburton, Kawartha, Pine Ridge District Health Unit, which is comprised of the following areas: the counties of Haliburton and Northumberland and the City of Kawartha Lakes.

D. Who decides if pesticides are in the category of food poisonings?

Poisoning consists of the ingestion of sufficient material, so as to cause illness that would come to the attention of a health-care provider. The illness must be coherent with what is known about the toxicity of the poison, and the dose or level of exposure sustained. There must be suspicion of poisoning, confirmation by appropriate clinical tests of biological measures exposure, effect or susceptibility. These tests must be in keeping with what is known about the chemical purported to have caused the poisoning.

As an example, if a condition reported to a health-care provider (HCP) is purported to be caused by ingestion of pesticides or by exposure to a pesticide in such levels as to cause illness, this condition must be identified by a registered HCP and reported to the health department for investigation. The initiation of the investigation must be by suspicion of the HCP, usually a physician in charge, who makes the diagnosis to the extent that he or she must document clinical, pathological, or pharmacological evidence of such poisoning. Evidence may include clinical picture of the poisoning, and corroborating laboratory information such as a biological marker of exposure, effect or susceptibility. Biological markers of exposure could be blood or urinary level of the pesticide or its metabolite, or an affected enzyme related to the action of the chemical (i.e. cholinesterase

level in the case of organophosphates). If the purported ingestion occurred from the consumption of a food, this would be investigated as a "food poisoning".

Poisonings are defined medically within the context of the toxicology of a substance – whether the substance is a natural plant or vegetable (as in mushroom intoxication), fish (as in ciguatera poisoning), or animal (scorpion bite). Usually, we refer to poisonings from "natural sources" such as animal toxins, as *envominations*. Hence, ciguatera poisoning from fish and domoic acid poisoning from mussels, are envominations. We then reserve the term poisoning to a generic chemical (non-biological) event, rather than a biological product or infection with bacteria.

Food poisoning is caused by toxins which are produced in food after the food has been accidentally inoculated with bacteria (i.e. Staphylococcus toxin) or spore (i.e. Bacillus cereus toxin), enteropathogenic and enterohemorrhagic bacteria (E. coli toxins, cholera vibrio toxins). Health departments have a mandate to investigate such poisonings if reported by health-care practitioner, or by the laboratory carrying tests in the course of treatment.

Many of the intoxications we see are caused by introduction of a bacterium into food that renders the food contaminated, and the diseases caused are *reportable*[27] (i.e. botulism)

E. Could the Health Unit investigate food poisoning cases we believe to be caused by pesticides?

A condition must be *identified medically* and *reported* if it is to be investigated by the health department. In short, a report of intoxication by a chemical (i.e. a pesticide poisoning) regardless of the source (food or otherwise) must come to the attention of the public health department after it is identified by a physician, laboratory, or other health care provider. If it is not identified medically, and reported, an investigation cannot ensue.

Summary:

1. The Board of Health's authority is derived from the Health Protection and Promotion Act, R.S.O., 1990 Chapter H.7. Board of Health's authority is derived from Provincial legislation, its mandate, objectives and goals are based upon that Provincial legislation.
2. The Board of Health usually meets monthly between September and June, on the third Thursday of the month.
3. The Board of Health for the Haliburton, Kawartha, Pine Ridge District Health Unit is comprised of the following areas: the counties of Haliburton and Northumberland and The Corporation of the City of Kawartha Lakes.

[27] Notifiable Diseases in Canada –current list as of 2000 - are listed in http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/00vol26/26s3/index.html

4. A poisoning must be diagnosed by a health-care provider and reported. If a poisoning is from the effects of a pesticide, then the health-care provider must identify it as such using accepted evidence and standards of practice.
5. A report must be made by the health-care provider or health-care agency to the public health department in order for the Health Unit to investigate under the HPPA - Mandatory Programs mandate. If the purported poisoning occurred from the consumption of a food, this would be investigated by the health department as a “food poisoning”.
6. The Health Unit can use its discretion to investigate an episode of reported poisoning. However, standards of proof must conform to accepted evidence in favor of poisoning and standards of practice.

Appendix B:

Documents Examined for this report (in addition to those provided by HKPR DHU)

2004 Program Overview. Halifax Regional Municipality Pesticide By-Law P-800 Respecting the Regulation of Pesticides, Herbicides and Insecticides
Author: Stephen King
Manager - Senior Advisor
Sustainable Environment Management Office
Environmental Management Services

The Impact of By-Laws and Public Education Programs on Reducing the Cosmetic / non-Essential, Residential Use of Pesticides: A Best Practices Review. March 24, 2004
The Canadian Centre for Pollution Prevention (800-667-9790; chris@c2p2online.com)
Cullbridge Marketing and Communications (613-224-3800; kassirer@cullbridge.com)

RRFSS Rapid Risk Factor Surveillance System. Report of Durham Regional Health Unit Survey on Pesticide Use. August 2004.

Canadian Cancer Society. General Information about pesticides. http:www://cancer.ca
Centers for Disease Control and Prevention. Fact Sheet, Pesticides. June 2004

Documents Provided by HKPR DHU
Canadian Association of Physicians for the Environment. Position Statement on Synthetic Pesticides.

Cantox Health Sciences International. Safety Evaluation of Pesticides – An Analysis of the Ontario College of Family Physicians Pesticide Literature Review. Prepared for Crop Life Canada. November 12, 2004.

Conlon D. Urban Pest Management Council of Canada. (Compendium of information on regulation, policy and related information on pesticides in Canada.)

A Community Member. Request to Ban Cosmetic Pesticides. Submitted to Dr. Noseworthy, Medical Officer of Health, Haliburton Kawartha Pine Ridge District Health Unit; November 2004. (A compendium of general information.)

Health Canada. A Canadian Perspective on the Precautionary Approach/Principle. (1992 Rio Declaration Principle 15: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capability. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation.")

Presentation to the Haliburton Kawartha Pine Ridge District Health Unit and Board of Health. Public Health and Medical Organization Position Statements and Medical Reviews Regarding the Need for Pesticide Control By-Laws. November 2004
(A compendium of statements and a copy of the City of Toronto Documents on its by-law.)

Ontario Agriculture and Food. Pesticide Regulations and Training Requirements. January 2002

Ontario Pesticides Advisory Committee Annual Report 20003-2004

OPHA Resolution on the Non-Essential Use of Chemical Pesticides on Public and Private Lands. 2001

Pest Management Regulatory Agency. Action Plan on Urban Use of Pesticides. Healthy Lawns Strategy for Urban Pesticide Risk Reduction. 2001.

PMG Consulting. December 2003. for Region of Waterloo Public Health. Regional Pesticide Working group Report on Opinions and Issues of pesticide applicators and service users toward lawn maintenance.

Sanborn M. et al. Ontario College of Family Physicians. Pesticides Literature Review. April 2004.

Region of Waterloo Public Health. Minutes of and Presentations to the Region of Waterloo Regional Pesticide Working Group.

Newspaper clippings on pesticides issues from local press

Copies of materials provided by Delegations to the Board of Health and MOH (including resolutions made by professional bodies about cosmetic pesticide use)

Correspondence and e-mails relevant to by-law issues from various community stakeholders

Documents on Pesticides issue from the City of Toronto
Documents on Pesticides issue from Region of Durham
Documents on Pesticides issue from the Region of Waterloo

Reports: Ontario College of Family Physicians; Cantox International Review of OCFP Report; Cancer Society Information on Pesticides.

Published Scientific Journal Literature

Alavanja MCR, Hoppin JA, Kamel F. Health Effects of Chronic Pesticide Expsoure: Cancer and Neurotoxicity. Annual Review of Public Health 2004;25:155-197

Arya N. Pesticides and Human Health. Why Public Health Officials Should Support a Ban on Non-Essential Residential Use. Canadian Journal of Public Health. 2005 (March-April):87-90

Farrow S. Using Risk Assessment, Benefit-Cost Analysis, and Real Options to Implement a Precautionary Principle. Risk Analysis 2004;24:727-735

Kelly S. Why have pesticides become the archetype of all that is wrong with modern society? Canadian Journal of Public Health. 2005 (March-April):85-86

Knopper LD, Lean DRS. Carcinogenic and genotoxic potential of turf pesticides commonly used on golf courses. Journal of Toxicology and Environmental Health Part B 2004;7:267-279

Tuomisto J. Is the precautionary principle used to cover up ignorance? Annotations and Reflections. Basic & Clinical Pharmacology & Toxicology 2004;95:49-52

Canadian Cancer Society April 2002. (Quotes from publication)
"Since ornamental use of pesticides has no countervailing health benefit, we call for a ban on the use of any pesticide for ornamental purposes that has not been scientifically demonstrated to be non-carcinogenic."

Appendix C:

Mandatory Programs – Health Hazard Investigation

Health Hazard Investigation

Goal:
To prevent or reduce adverse health outcomes resulting from exposure to health hazards* as defined in the Health Protection and Promotion Act and including biological, physical, and chemical agents, natural or manmade.

Objectives:

1. To identify health hazards and take appropriate action.
2. To ensure community health protection and continued public health services delivery in the event of a health hazard.

Requirements and Standards:

1. The Board of Health shall provide an initial response or investigation when occurrence of a disease or mortality appears to be significantly higher than expected.
2. In accordance with the Health Protection and Promotion Act, the Board of Health shall identify, investigate, and manage health hazards.
3. The Board of Health shall monitor health hazard management strategies annually or more frequently as required to ensure effectiveness.
4. The Board of Health shall consult with and provide advice to the community about health hazards when such hazards are identified.
5. The Board of Health shall provide educational materials to raise public awareness of health hazards.
6. The Board of Health shall ensure timely response to reports of health hazards through the provision of:
    i. an on-call system that ensures 24-hour availability of Board of Health staff to respond;
    ii. same-day assessment and initiation of action within 24 hours if a health hazard is identified; and
    iii. a written response plan which is updated annually or more frequently as required.
7. The Board of Health shall report on health hazards in the community as outlined in Program Planning and Evaluation, requirements 2(f) and 3.

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* Health hazard means: a) a condition of a premises; b) a substance, thing, plant or animal other than man; c) a solid, liquid, gas or combination of any of them, that has or that is likely to have an adverse effect on the health of any person. (Health Protection and Promotion Act)

Appendix D:

Table 1: Summary of pesticide by-laws for the cities of Kingston, Toronto, and Halifax

General Characteristics of Municipality	By-law	Properties Affected/Exempted	Enforcement	Estimated Cost
City of Kingston				
- Population in 2001: 114,195 - Land area (square kilometers): 450.39 - Total private dwellings: 50,755	- By-law is currently being developed - Objective of by-law is to minimize or eliminate the cosmetic use of chemical pesticides on public and private properties - Create a Pesticide Reduction Task Force to undertake public consultation and develop/evaluate strategies to achieve cosmetic pesticides reduction on public and private lands	- No information available at this time	- No information available at this time	- No information available at this time
City of Toronto				
- Population in 2001: 2,481,494 - Land area (square kilometers): 629.91	- Effective date: April 1st, 2004 - Includes a series of exemptions	- Exempted products include insecticidal soaps, fatty acids, mineral oils,	- Phased approach to enforcement - Conducted by Public Health Inspectors	Implementation Budget 2004: - Notification: $150, 000 - Compliance: $200,000

General Characteristics of Municipality	By-law	Properties Affected/Exempted	Enforcement	Estimated Cost
- Total private dwellings: 965,554	- Does not mention signage, notification, or use on golf courses - Enforcement is not specified in the by-law - Is currently being challenged in court	horticultural vinegar (acetic acid), diatomaceous earth, biological controls such as Bacillus thuringiensis (Bt) and nematodes, borax, ferric phosphate, pyrethrum or pyrethrins, and sulphur - *Permitted uses* are: to control a health hazard; purify water; disinfect swimming pools; control termites and rodents; control noxious weeds to comply with the Weed Control Act; personal use as an insect repellent; use as a wood preservative; enclosed insecticide bait; injected	- Phase I: - Issuing warning for non-compliance April to August 2005 - Respond to complains within 24 hours when possible - Issue warning letter to anyone found in violation - Phase II: - Issuing fines starting September 2005 - Fine under the by-law is $255 - If merited, application of a warrant to search for non-permitted pesticide use	- Complaint Response: $100,00

General Characteristics of Municipality	By-law	Properties Affected/Exempted	Enforcement	Estimated Cost
		treatment for trees and poles; and to control infestations which involve an immediate or potential risk of substantial loss or damage to properties - Excluded are golf courses		
City of Halifax				
- Population in 2001: 359,111 - Land area (square kilometers): 5,460.90 - Total private dwellings: 153,328	- By-law phased in over 3 years - Phase I: - Effective August 19th, 2000 - Immediate ban on municipal properties - Phase II: - Effective April 2001 to March 2003 - Ban of pesticide use on: - Residential properties in close proximity to	- All residential and municipal properties within the Halifax Regional Municipality - Excludes institutional and commercial properties - Allows pesticide application for non-cosmetic purposes through a permit process	- Enforcement not specified in by-law, but is only in response to complaints and relies on eyewitness testimony and physical evidence such as product containers - Emphasizes that the focus of the program is voluntary compliance, leadership by example and the promotion of practical alternatives	- Start-up: $200,00 - Roll-out (2000/01): $120,00 - Implementation (2001/02): $210,000 - Estimated operating budget (2002/03): $197,000

General Characteristics of Municipality	By-law	Properties Affected/Exempted	Enforcement	Estimated Cost
	medically registered properties i.e. properties whose occupants suffer from the effects of pesticides - Properties that border schools, day care centres, playgrounds, parks, churches, seniors' residences, universities, and hospitals. - Phase III: - Effective April 1st, 2003 - General ban on the cosmetic use of pesticides on all residential and municipal properties		alternatives - Enforcement is viewed as a last resort	

Appendix E:

A web-based literature search sought information from Canada on pesticide regulation, cosmetic pesticide by-law, cities with by-laws, and experience with by-laws such as evaluation, costs of implementation, policing and compliance.

The proposed new Pest Control Products Act - pest management regulation in the 21st century http://www.hc- sc.gc.ca/english/media/releases/2002/2002_17bk1.htm

History of Pesticide Regulation in Canada
http://www.sierraclub.ca/national/programs/health-environment/pesticides/pesticide-regulation.html

Municipal law -- By-laws -- Regulation and restriction of pesticide use – **Indexed as: 114957 Canada Ltée (Spraytech, Société d'arrosage) *v.* Hudson (Town) Neutral citation: 2001 SCC 40.** File No.: 26937. 2000: December 7; 2001: June 28. Present: L'Heureux-Dubé, Gonthier, Iacobucci, Major, Bastarache, Arbour and LeBel JJ. ON APPEAL FROM THE COURT OF APPEAL FOR QUEBEC *Municipal law -- By-laws -- Regulation and restriction of pesticide use -- Town adopting by-law restricting use of pesticides within its perimeter to specified locations and enumerated activities -- Whether Town had statutory authority to enact by-law -- Whether by-law rendered inoperative because of conflict with federal or provincial legislation -- Town of Hudson By-law 270 -- Cities and Towns Act, R.S.Q., c. C-19, s. 410(1).*

http://www.sankey.ws/hudson.html The narrative of the Hudson, Quebec Pesticide By-Law.

http://pestinfo.ca/main/ns/8/doc/25/lang/EN Information and fact sheets on pesticides in Canada.

Scientific literature search for key publications in the peer reviewed journals focusing on reviews of health effects of cosmetic use of pesticides as they relate to pesticide by-laws. Review articles from 1995 onwards were arbitrarily chosen for background information for this paper.

Key terms:

Review articles
Cosmetic pesticide use and health effects
Urban pesticide use and health effects
Pesticide regulation and health effects

Appendix F:

Canadian Cities with Pesticide By-laws (last update 2004)
Toronto, ON 2,481,494 Pesticide By-law Approved
Vancouver, BC 545,671 Pesticide By-law Approved
Halifax, NS 359,111 Pesticide By-law Approved
Longueuil, QC 128,016 Pesticide By-law Approved
Sherbrooke, QC 75,916 Pesticide By-law Approved
Verdun, QC 60,564 Pesticide By-law Approved
Pierrefonds, QC 54,963 Pesticide By-law Approved
Caledon, ON 50,595 Pesticide By-law Approved
Dollard-des-Ormeaux, QC 48,206 Pesticide By-law Approved
Saint-Eustache, QC 40,378 Pesticide By-law Approved
Anjou, QC 38,015 Pesticide By-law Approved
Boucherville, QC ` 36,253 Pesticide By-law Approved
Blainville, QC 36,029 Pesticide By-law Approved
Côte-Saint-Luc, QC 30,244 Pesticide By-law Approved
Pointe-Claire, QC 29,286 Pesticide By-law Approved
Boisbriand, QC 26,729 Pesticide By-law Approved
Sainte Thérèse, QC 24,269 Pesticide By-law Approved
Saint-Bruno-de-Montarville, QC 23,843 Pesticide By-law Approved
Port Moody, BC 23,816 Pesticide By-law Approved
Val-Bélair, QC 21,332 Pesticide By-law Approved
Saint-Lambert, QC 21,051 Pesticide By-law Approved
Kirkland, QC 20,434 Pesticide By-law Approved
Chambly, QC 20,342 Pesticide By-law Approved
Vaudreuil-Dorion, QC 19,920 Pesticide By-law Approved
Westmount, QC 19,727 Pesticide By-law Approved
Beaconsfield, QC 19,310 Pesticide By-law Approved
Beloeil, QC 19,053 Pesticide By-law Approved
Mont-Royal, QC 18,682 Pesticide By-law Approved
Saint-Lazare, QC 12,895 Pesticide By-law Approved
Thorold, ON 18,048 Pesticide By-law Approved
Dorval, QC 17,706 Pesticide By-law Approved
Greenfield Park, QC 16,978 Pesticide By-law Approved
Mont-Saint-Hilaire, QC 14,270 Pesticide By-law Approved
L'Ile Bizard, QC 13,861 Pesticide By-law Approved
Rosemere, QC 13,391 Pesticide By-law Approved
Sainte-Anne-des-Plaines, QC 12,908 Pesticide By-law Approved
Pincourt, QC 10,107 Pesticide By-law Approved
Lorraine, QC 9,476 Pesticide By-law Approved
Notre Dame de l'lle Perrot, QC 8,546 Pesticide By-law Approved
Prevost, QC 8,280 Pesticide By-law Approved
Nicolet, QC 7,928 Pesticide By-law Approved
Otterburn Park, QC 7,866 Pesticide By-law Approved

Ontario Cities with proposed or approved pesticide by-law

Toronto ON 2 481 494 Pesticide By-law Adopted
St Catharines ON 129 170 Pesticide By-law Drafted
Peterborough ON 71 446 Pesticide By-law Drafted
North Bay ON 52 771 Pesticide By-law Adopted
Caledon ON 50 595 Pesticide By-law Adopted
Orangeville ON 25 248 Pesticide By-law Drafted
Thorold ON 18 048 Pesticide By-law Adopted
Elliot Lake ON 11 956 Pesticide By-law Drafted
Perth ON 6 003 Pesticide By-law Adopted
Cobalt ON 1 229 Pesticide By-law Adopted
The Archipelago (Parry Sound) ON 505 Pesticide By-law Adopted

Five of these have framed the law in different ways, from a language of regulatory control ("ban pesticides") to one of information and cooperation for a specific goal (Healthy Horticultural Landscapes), as follows:

- Town of Caledon: Healthy Horticultural Landscapes By-law
- City of Thorold: By-law to Regulate the use of Pesticides and Herbicides
- City of Toronto Pesticide By-law
- Cobalt: First City in Ontario to Ban Pesticides
- Town of Perth: Pesticide Control By-law

Appendix G:

The Impact of By-Laws and Public Education Programs on Reducing the Cosmetic / Non-Essential, Residential Use of Pesticides: A Best Practices Review March 2004 (Done for the City of Toronto)

4.0 Conclusions and Recommendations

4.1 Conclusions

• By-laws / laws have achieved greater reductions in pesticide use than education programs alone. All of the communities that have reached a high level of reduction have had a by-law in place and/or a community-wide decision to reduce pesticide use.

• It's helpful to require residents to apply for their own permits when they wish to use pesticides that have been banned. Not only does this help reduce the number of permits requested, it also provides an opportunity to educate applicants in a personalized, one-on-one manner. Such systems have been shown to work well in the small communities in Quebec, but it is not yet clear how practical they are for larger communities. This is an area that deserves further research in the future.

• A combination of public education and enforcement is required to ensure compliance with by-laws and legislation. The education must have a strong horticultural component.

• Where possible, public education and outreach campaigns to reduce residential pesticide use should, at the same time, promote other sustainable landscaping practices such as grass-cycling, naturalization and xeriscaping. This makes them more cost-effective and also more attractive to potential retail partners.

• The cost to implement a by-law appears to be in the order of $0.50-$1.00 per person per year.

• **The cost to implement an outreach component alone appears to be in the order of $0.13 to $0.24 per person per year.**

• This is a relatively new area of study. By-law and outreach approaches are being tested and refined. Mechanisms for providing timely, reliable impact data are still being worked out. The Canadian municipalities that are making decisions today are in need of current information about costs per capita, best practices, and what isn't working and why.

4.2 Recommendations

• The federal government should implement its national pesticide sales database as quickly as possible, so that progress can be monitored more easily.

• This project's research findings should be shared immediately with municipalities and regions that are currently planning outreach projects, including our three sponsoring municipalities.

• It's time to move forward with phase two of this project: dissemination of the research findings across North America to further capacity-building activities.

Appendix H:

Pesticides commonly used or available for lawn and garden applications (Source: Lawn and garden pesticides: A review of human exposure and health effects research, City of Toronto)

Pesticide	Class	Target	Mode of Action	Some Trade or Common Names	Acute Toxicity[87]	Regulatory Status
HERBICIDES						
2,4-dichlorophenoxyacetic acid (2,4-D)	Phenoxy acid	Various broadleaf weeds	Systemic herbicide Affects plant growth	Killex, Triosp, Premium 3-way, Par III and Trillion[88]	Moderate to slight	General Use Pesticide Under re-evaluation since 1992; APUUP[89]
Mecoprop (MCPP)	Phenoxy acid	Various broadleaf weeds	Systemic herbicide Affects plant growth	Killex, Triosp, Premium 3-way, Par III and Trillion	Slight	General Use Pesticide APUUP
Dicamba	Phenoxy acid	Various broadleaf weeds	Systemic herbicide Affects plant growth	Killex, Triosp, Premium 3-way, Par III and Trillion	Slight	General Use Pesticide APUUP
4-chloro-2-methyl-phenoxyacetic acid (MCPA)	Phenoxy acid	Various broadleaf weeds	Systemic herbicide Affects plant growth	Herbatox (?)	Slight	General Use Pesticide APUUP
Glyphosate	Organophophate	Broadleaf weeds, grasses	Broad spectrum, non-selective, systemic	Roundup Gallup, Landmaster, Pondmaster, Ranger, Rodeo, Touchdown	Slight	General Use Pesticide
INSECTICIDES						
Carbaryl	Carbamate	Various insects (earwigs, ants, grasshoppers)	Cholinesterase inhibitor (reversible)	Sevin	Slight	General Use Pesticide APUUP

[87] High acute toxicity means the substance is extremely dangerous if not properly handled and can be fatal in relatively small amounts (0.1 to 3.0 mls).
Moderate acute toxicity means the substance is of moderate danger if not properly handled. They can be fatal in larger amounts than high acute toxicity substances (3 to 30ml).
Low acute toxicity means the substance should be handled with caution, but is only fatal if there is deliberate ingestion of amounts greater than 30ml. (Source: OMAFRA, 1999)

[88] Mixtures of 2,4-D, dicamba and mecoprop.

[3] APUUP = Action Plan on Urban Use Pesticides, the re-evaluation of seven common lawn and garden pesticides (PMRA, 2000a)

Pesticide	Class	Target	Mode of Action	Some Trade or Common Names	Acute Toxicity[87]	Regulatory Status
Chlorpyrifos	Organophosphate	Various insects Grubs	Cholinesterase inhibitor	Dursban, Lorsban, Pyrifos	Moderate to slight	Re-evaluation of organophosphates (PMRA, 1999) Phase-out of residential use products by 2002 (PMRA, 2000c)
Diazinon	Organophosphate	Various insects	Cholinesterase inhibitor	Basudin	Moderate	Re-evaluation of organophosphates (PMRA, 1999) and APUUP Phase-out of residential use products by 2003 (PMRA, 2001d)
Malathion	Organophosphate	Various insects (aphids, spider mites, tent caterpillars, etc.)	Cholinesterase inhibitor		Moderate	General Use Pesticide Re-evaluation of organophosphates (PMRA, 1999) and APUUP
D trans allethrin (bioallethrin or allethrin)	Pyrethroid	Various insects Spiders		various	Moderate	General Use Pesticide
Permethrin	Pyrethroid	Various insects ear wigs, spiders, sowbugs		various		General Use Pesticide
Resmethrin	Pyrethroid	Various insects Hornets, wasps		various		General Use Pesticide
Imidacloprid	Chloro-nicotinyl	Various insects	Blocks nicotinergic pathways	Merit	Slight	Restricted use, only by licensed applicators
FUNGICIDES						
Benomyl	Benzimidazole	Disease, mold on fruits & vegetables		(Benlate)	Slight	General Use Pesticide (Voluntary withdrawal of product announced in U.S. Oct 2001)
Captan	Phthalimide	Plant disease, blight, mold			Slight	General Use Pesticide

Sources: EXTOXNET Pesticide Information Profiles http://ace.orst.edu/info/extoxnet/pips/ghindex.html; OMAFRA (1999); PMRA label search http://64.26.129.82/search/queryhit.htm