




Pesticide Toxicity Report
CPS2017-0510

SPC on Community &
Protective Services
2017 June 7



Council Direction

MOTION ARISING, 2016 November 07

Direct Administration to evaluate pesticide toxicity as part of the Integrated Pesticide (sic) Management Plan review, with the goal of eliminating the more toxic pesticides from use on city land. As well, include members of the public who are health professionals or from health organizations as part of the review team and return to City Council, through the SPC on Community and Protective Services, no later than 2017 Q2 on the progress made.

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Background

Pesticide authority

Pest Management Regulatory Agency (of Health Canada)

Pesticide definition

Pesticide: controls pests; includes herbicides, insecticides, fungicides, pool chemicals, insect repellents, etc.

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Findings


↓ Risk = ↓ toxicity x exposure
or

↓ Risk = toxicity x ↓ exposure

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Findings cont'd


Managing risk: 3 tiers of risk reduction

1. Federal regulations (Health Canada)
2. Provincial regulations (Alberta Environment and Parks)
3. City policy (Integrated Pest Management Plan and Policy)



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Findings cont'd

Stakeholder perspectives on pesticide use

1. Voluntary pesticide use restrictions: stakeholders support an integrated approach (ie: judicious use of pesticides) to manage pests
2. Non-voluntary pesticide use restrictions: stakeholders support some degree of regulatory (ie: bylaw) pesticide restriction

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Conclusion

1. Pesticide use reduction

The level of pesticide exposure risk to Calgarians from The City's use of pesticides is acceptable; The City must strive for continued risk reduction strategies

2. Integrated Pest Management Plan revision

The City will update current policies and procedures for pest management including broad professional and public engagement

3. Accountability

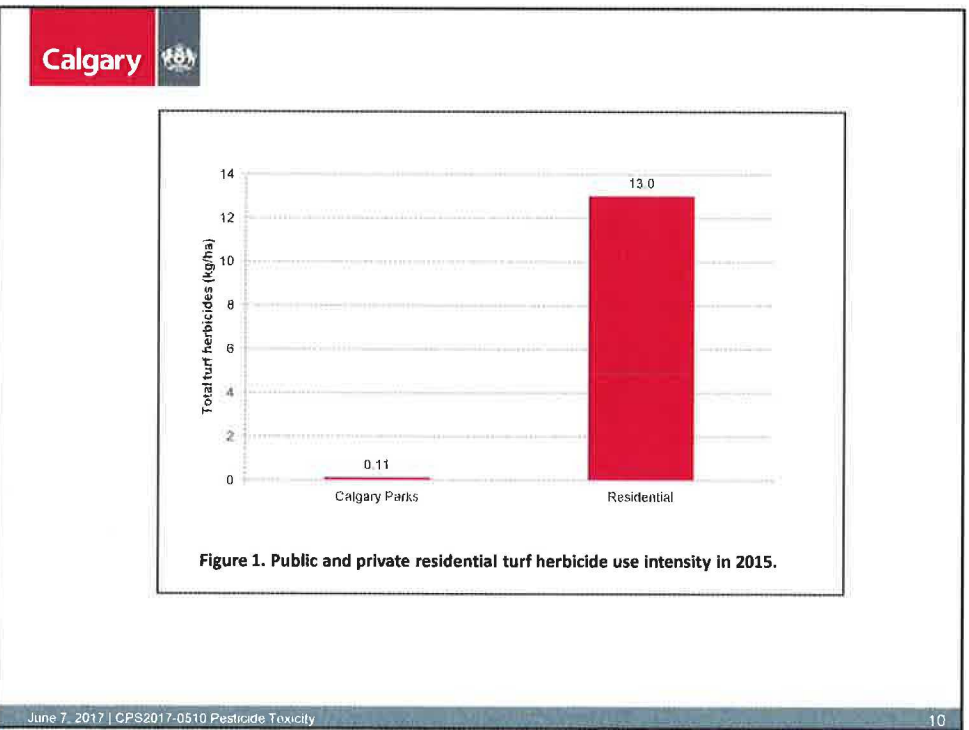
The City will improve its public accountability through regular reporting of pesticide use and promote its pesticide reduction strategies



Administration Recommendations

That the SPC on Community and Protective Services recommends that Council:

1. Receive this report for information; and
2. Direct Administration to use the Pesticide Toxicity Report to inform the update to the Integrated Pest Management Plan and Policy.



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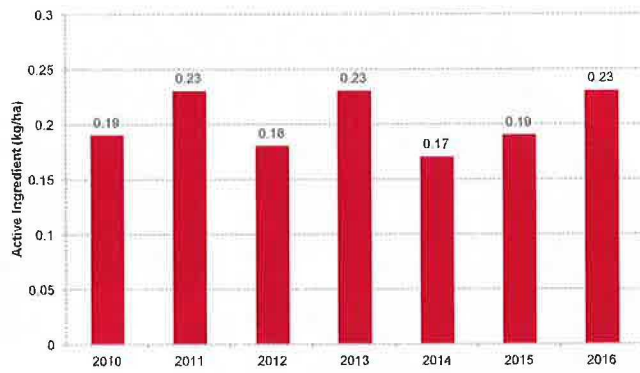


Figure 2. Herbicide use intensity by The City of Calgary from 2010-2016, expressed as active ingredient per hectare. In 2010, the Weed Control Act was updated to reflect provincial priority weed species.

Pesticide Toxicity Report

June 7th, 2017 by Larry

Heather jerusalem1@shaw.ca

There are those who think that returning to a pre-industrial age of pest and weed control is somehow a state of advancement. But just as our own souls have to be weeded from unproductive and invasive activities that crowd out productive growth, the same is true of nature. Nature we have learned from our earliest ancestors is far from being in a state of perfect balance. We learn on the excavations of past civilizations who have faded away, being dissolved into the surroundings by the jungle or by the desert.

We are told that Nature can manifest as abnormal and unbalanced. "The ground will produce thorns and thistles...you will eat from it by means of painful labor." When we apply this observation to the Urban environment, we see that keeping a civilized non jungle environment, requires a great deal of work. Whether it be the threats of SnowTember, the 2013 flood, a harsh winter, or a carbon tax to freeze us out of our homes, life in Calgary is not a utopian work free Shangri-La.

There are those of Socialust mentality who so believe in egalitarianism, that an acceptable result. is equal impoverishment and misery for all. But this is not the road to a civilized Calgary. The voters are not asking for the current despicable state of park and boulevard care that we are seeing. Our grass has been literally deluged by dandelions, which makes residential maintenance very onerous and lowers the standards of orderliness citywide. In fact, it indirectly encourages the growth of crime, both property and personal.

The way that grass is not weeded or cut until just before Stampede, great contributes to the slumification of our great City of Calgary. Living in slums amidst Hooverville shantytown conditions CityWide, while monumental projects are built in the Core is not an equitable solution. Our preceding City fathers, would react in horror at the standards of neglect that are beginning to predominate our everyday practices. Even the starvation of waste landfill hours reflects this extreme detachment from reality and fuels garbage dumping on private and public lands.

The neglect of the gopher infestations that took place over five months last summer, just two blocks north of this City Hall, on Memorial Drive, and the Rundle ruins show the negative effects this back to crude nature retroprimitivism. These are Third World Standards we are descending to. And some indeed want to exact that revenge on us.





Submission to City of Calgary
Standing Policy Committee on Community and Protective Services
June 7, 2017

Response and Recommendations concerning
Pesticide Toxicity Report CPS2017-0510

1. The Report should be amended to be more responsive to the direction of City Council's motion of November 7, 2016.

The Canadian Association of Physicians for the Environment (CAPE) notes that the City Council motion of November 2016 requested evaluation of pesticide toxicity in reference to products used in the City's IPM program. However, such information is absent from the Report. Although the Report indicates that 31 of the 35 pesticide products used by the City in 2016 are in the second-highest risk category (as set out in Alberta regulations), there is no list of what these pesticides are, nor any ranking of them by toxicity, nor any identification of which ones are prospects for discontinuation so as to achieve the goal identified in the motion -- "eliminating the more toxic pesticides from use on city land."

As to the Report's contention that pesticide evaluations can only be carried out by Health Canada's Pest Management Regulatory Agency (PMRA), it is stretching credibility to suppose that City Council's motion was asking for such a formal and detailed review of pesticides, which would require the conduct of laboratory-based toxicology studies, literature reviews, and assessments of neurological, endocrine and immunotoxicity impacts, among much else. A more common sense understanding is that Council was requesting a relative toxicity ranking of pesticides used by the City, guidance for which can be obtained from product labels and Material Safety Data Sheets.

CAPE suggests that the Report will be of greater assistance to City Council if it is amended to include the information requested in Council's motion.

2. The Report should be amended to acknowledge health evidence and to reflect such evidence in recommendations and proposals for change in pesticide use.

Although the Motion adopted by City Council in November 2016 directs that City Administration should "include members of the public who are health professionals or from health organizations as part of the review team," the resulting Report does not describe, summarize or outline what health concerns are associated with pesticide use. None of the seven key findings listed on page 1 of the report makes mention of health. The concept of "risk" is referenced in a number of places throughout the Report, but there is no account that would assist Council in understanding what these risks are with respect to pesticide exposures.

CAPE provided a letter in January 2017 highlighting a number of reviews that examined a total of more than 500 epidemiological studies of pesticide exposures. (Epidemiology can be understood as the branch of medicine that investigates the prevalence and distribution of diseases in selected populations.) This body of research determined that health risks associated with exposure to pesticides include adverse reproductive, neurological and respiratory outcomes that are particularly significant for children, pregnant women and newborns.

Adverse health impacts include increased risks for a range of physical and developmental conditions such as low birth weight and pre-term births in babies, deficits in cognitive and motor development in children, hormonal (endocrine) disruption, asthma and obstructive lung disease, birth defects, learning disabilities and other developmental deficits. In many studies, the harmful effects noted in children were related to the exposure of their mothers during pregnancy or to children's exposure at a young age.

Such evidence should be included in the Report because it provides a rationale for eliminating the more toxic pesticides from use in the City of Calgary's IPM program, consistent with the direction of City Council's November 2016 motion.

3. The Report should be amended to take account of limitations in the data and pesticide registration process used by the federal Pest Management Regulatory Agency (PMRA).

CAPE is concerned that the Report reflects over-confidence in the pesticide registration process administered by Health Canada's PMRA. CAPE's earlier letter noted serious concerns about PMRA processes identified by the federal Commissioner of the Environment and Sustainable Development (an officer of the federal Auditor-General's department) in a 2015 report. Others have also raised concerns about short-comings in the PMRA system.

CAPE believes that the PMRA over-relies on industry-supplied studies and fails to take sufficient account of population-based epidemiological research that considers the real-world effects of pesticide exposure on humans. For example, risks from cumulative exposure to more than a single pesticide are not adequately addressed. Gaps in data and critical flaws in the PMRA evaluation process mean that we cannot depend on Health Canada's assurances of pesticide safety, because the evidence that supports such claims is seriously deficient.

4. It is reasonable for decisions about pesticide use to reflect public interests and concerns.

There is strong public support in Alberta for action on cosmetic pesticides. In August 2016, a poll conducted for CAPE in partnership with several other organizations found that more than two-thirds of Albertans are concerned that pesticides pose a threat to the health of their children and their pets. Residents in Calgary were surveyed as part of this poll.

CAPE will be pleased to further assist the City of Calgary in its reconsideration of pesticide use. Thank you.

Randall McQuaker, Pesticides Director
Canadian Association of Physicians
for the Environment (CAPE)



Chairman Gian-Carra Carlo and members of the Standing Policy Committee of Community and Protective Services, June 7, 2017

RE: Pesticide Toxicity Report, CPS2017-0510

After a generation of Integrated Pest Management (IPM) in Calgary, as you consider pest control on Calgary lands we are disappointed that the re-examination of pesticide use in the present staff report does not reflect the information provided by *Prevent Cancer Now*, and contains inaccuracies.

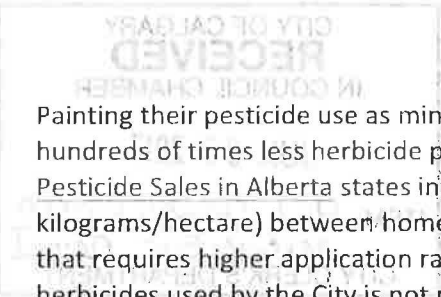
Although Calgary is working on alternative weed control with goats, fostering edible plants and community gardens, and naturalization with less manicured turf, the current report is focused on pesticides. Here Calgary is less progressive, and this result of unadvertised consultation, not only fails to follow Council's direction to assess pesticide relative toxicities, it fails to detail pesticide use, defies logical thought and contains outright misinformation. I am writing to set the record straight on a few points.

Contrary to Calgary staff's reassuring claims, Health Canada's assessments are very limited. There is no federal facility for pesticide toxicity testing, and assessments are one-chemical-at-a-time paper exercises. The Commissioner of the Environment and Sustainable Development repeatedly criticized Health Canada's pesticide assessment process in 2015 as well as in 2008 and 2003. Please see attached our factsheet on pesticide assessment.

"Industry" influence on Calgary staff is obvious up front in the staff report, featuring the out-dated notion that "the dose makes the poison." Medical specialists and scientists have been raising alarm for decades that chemicals can affect hormone systems at very low doses, contributing to birth defects, developmental problems, harm to the nervous and immune systems, and cancers. Common pesticides can contribute to the same chronic diseases we see increasing in the young, with escalating costs hobbling our health care system and economy. This "endocrine disruption" is given little if any weight in federal chemical assessments.

Pesticides are not assessed in combination with other chemicals. In light of a meeting with Health Canada staff, a group of experts concluded that a recent Health Canada proposal for cumulative assessment of pesticides amounts to late-in-the-day baby steps that is unlikely to affect pesticide use.

Data on new pesticides is provided by pesticide companies, in confidential reports of experiments using doses far above environmentally relevant exposures. After decades on the market, academic researchers' reports of adverse effects of pesticides – peer-reviewed scientific studies – are often dismissed as being unreliable. Based on the open science, the World Health Organization's International Agency for Research on Cancer (IARC) concluded that several pesticides used by the City of Calgary may well cause cancer, but this was but a small bump in the road for the federal regulators. No federal bans are imminent. Indeed, bans are rare – Canada never even banned the notorious Agent Orange ingredient 2,4,5-T. The registration eventually lapsed as actions were taken by other countries around the world.

Painting their pesticide use as minimal, staff makes a misleading claim that the City uses hundreds of times less herbicide per hectare than homeowners. In fact, the 2013 Overview of Pesticide Sales in Alberta states intensity of use comparisons (active ingredient kilograms/hectare) between homeowners' application of the safer alternative corn gluten meal, that requires higher application rates, with the quantity of potent concentrated chemical herbicides used by the City is not relevant. As evidence indicates that the citizens are choosing least-toxic options, it is time for the leaders to follow.

After seven months of secretive study, Calgarians deserve better. Ultimately the misleading and ill-founded staff report illustrates why pesticides restrictions are needed. Ontario has a "white list" of least-toxic pest control options to protect even the most vulnerable.

As lilacs bloom, Canadians fortunate enough to be protected with pesticide restrictions again take a deep breath, thankful to enjoy floral fragrance rather than the stench of phenoxy herbicides. They are confident that their children, environment and waterways are safer. As Canada's largest city without these protections for its citizens, we firmly hope that it is time for Calgary to join the big leagues. Please do not hesitate to ask, if *Prevent Cancer Now* can be of any assistance.

Sincerely,

Meg Sears

--
Meg Sears PhD
Chair, Prevent Cancer Now
613 832-2806
613 297-6042 (cell phone)
Meg@PreventCancerNow.ca
www.PreventCancerNow.ca

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City of Calgary Review of Integrated Pest Management Plan (1998)

Submission regarding the evaluation of pesticide toxicity and children's health

Submitted by: Dr. Joyce M. Woods RN, BN, BA, MEd, PhD

Date: Feb 3, 2016

Attention: Steven Snell, MRes, MCIP, RPP, City of Calgary, Conservation Policy Team Lead

Via: email



First of all, it is so encouraging to hear that the City of Calgary Council has directed Administration to evaluate pesticide toxicity with the goal of eliminating the use of the more toxic pesticides on City-owned land as it has been many years since this was last discussed. Calgary has been criticized in the past for not protecting its citizens from toxic pesticides despite the awareness that these chemicals have long been linked to serious diseases, disorders and other health-related concerns.

Of greatest concern for me is the impact these chemicals have on children's health. I am pleased to submit my position as a concerned citizen, a long-standing health care worker and as an Advisory Board member for the Coalition for a Healthy Calgary. I will speak from the position of having studied the impact of toxic chemicals on our health with a special interest in children's health for more than twenty years.

I have authored a book called "Indoor Air Pollution... The Silent Killer" and developed two courses for Mount Royal University related to chemicals and the impact they have on our health. The first course was entitled "Children's Environmental Health..., *children run better unleaded*" which was developed for Continuing Education and the second is called Integrative Healing Practices and speaks to environmental impacts on health. This second course is delivered in both the Nursing and Midwifery Program and the Integrative Health Coach Program for Continuing Education. I spent many years presenting seminars throughout North America on environmental wellness, served on the Advisory Board for the Integrative Health Institute at Mount Royal University for seven years and as an Advisory Board Member for the Coalition

for a Healthy Calgary for eight years. I am also listed on the Experts Directory at Mount Royal University to address issues identified by the City and community on environmental concerns. Most recognized of these concerns was the asbestos incident in the Harry Hays Building and the mice infestation in a local food chain. I have been employed by Mount Royal University for seventeen years as an Associate Professor, Department of Nursing and Midwifery.

We have far too long overlooked the health of our children not recognizing the trends that have occurred over the past years. Disturbing health care trends already well-researched and documented show us that the effects of environmental toxins on children's health could turn out to be one of the largest public health crises we will ever face. Much of the delay for attending to this very serious problem is related to the fact that it takes many years to realize the consequences of toxic exposures. Decades later, we begin to see epidemics of diseases we refer to as "*new*" or "*rising*" and at that time we look back and see a correlation between exposure to certain toxic chemicals and these epidemics of disease and disorders.

We have seen this scenario before with cigarette smoke, asbestos, lead additives, bisphenol A (hormone disruptors), PBCs, DDT and hundreds of consumer products promoted as safe and nontoxic until it was discovered how dangerous they were - this is far too late. Let me refer to the Precautionary Principle". This Principle states that if an action or policy has a suspected risk of causing morally unacceptable harm to the public, or to the environment, in uncertainty or the absence of scientific consensus or understanding, the "*burden of proof*" that it is not harmful falls on those taking that action -- that means the persons who are responsible for making those decisions shall also take action to avoid or diminish that harm. "*Morally unacceptable*" refers to: threatening to human life or health, having serious or effectively irreversible health effects and/or imposed without adequate consideration of the human rights of those affected. This Principle clearly denotes a duty to prevent harm when it is within our power to do so. Advocates of this approach not only see it as a means of "*preventing morally acceptable harm to the public*" but as a means of fast-tracking inherently toxic contaminants towards regulatory phase-down and ultimately a total phase-out.

Earlier decisions to ban substances were examples of standards that recognized the “*inherent toxicity*” of the substances in question. In the majority of these cases, evidence of morally unacceptable harm was only suspected, difficult or impossible to prove, and strongly contested by the industries responsible for the production of these substances and ultimately, the contamination.

In making public health policy decisions, it is important to recognize that the majority of occupational standards for toxic contaminants were derived from animal testing which means that standards for environmental exposure could have been set at 10 to 100 times the level for human exposure in occupational or environmental settings. This notion of using “safety factors” in order to set standards for chemical exposures at levels 10 times, 100 times, etc., lower than the level where health effects are known or detected continues to be a key aspect of ever-more refined standard setting approaches to this day. Out of this practice comes the term “*threshold*” - the level at which a health effect is detected. Considerable debate continues over whether or not morally unacceptable health effects occur below these thresholds, once again, a strong reason for applying the Precautionary Principle.

There is now much scientific evidence to support the long standing belief of many researchers that pesticide use has both immediate and long-term impacts on human health, and especially the health of children. It is so important to differentiate the impact of toxic chemicals on children as they are much more vulnerable in so many ways. So often we think of children as “*little adults*”; this is a serious mistake as children are so much more impacted by exposure to toxic chemicals.

Published data from a variety of reputable sources strongly suggest a link between toxic exposure, developmental abnormalities, and a variety of chronic diseases and disorders in children. Several factors make children particularly vulnerable to toxic contaminants including increased exposure, immature detoxifying systems, and timing in children's critical developmental growth stages when exposures would normally occur.

Children are generally more susceptible to the toxic effects of pesticides because of their immature stage of neurological development. We have known for some time that the blood brain barrier does not fully close until about the age of two and there is now considerable scientific evidence that the brain is not fully formed until the age of 12. Because of this very slow development, childhood exposure to very common pesticides may greatly impact the development of the nervous system resulting in numerous health problems. Children's ability to detoxify chemicals is also not as efficient as in adults as they have immature enzymatic defense (antioxidant) pathways coupled with limited intake of detoxifying nutrients.

There are many things to consider about children when we look at the impact of pesticides. They have a much greater skin surface for their size than adults so absorb proportionally a greater amount of all toxic substances they are exposed to through their skin, lungs and intestinal tracts. Because children breathe faster than adults they take in more air. They also take in more food and water per pound of body weight than adults. Scientific evidence has also shown us that children do not fully develop their immune systems or detoxifying mechanisms until early teenage years greatly reducing their ability to fight the introduction of toxic contaminants into their system.

Many toxins are absorbed through the skin and stored in fatty tissue. Children have a much higher proportion of fatty tissue per body size than adults increasing their vulnerability.

Children are also much closer to the ground than adults and often engage in activities that have contact with ground and grass -- this is how they explore and get to know the world. Very young children tend to put their hands or other things in their mouths which further increases their exposure to toxic pesticides. It is this combination of increased exposure to pesticides and the lack of defenses related to bodily development to combat the toxic effects of pesticides that puts children at such a high risk.

The vulnerability of children is also enhanced as they experience all types of changes in their hormonal

chemistry, especially during puberty. When the rapid shifts in growth occur during puberty, important endocrine signals need to occur in a very precise fashion. The disruption of these hormonal messages is highly suspected for the reason girls are going through puberty at such an early age. We are commonly witnessing girls beginning menstrual periods at 8 years of age even though they are not yet ovulating -- a suspected strong connection to additional years of exposure to unopposed estrogen -- a risk factor for breast cancer. Organophosphate pesticides are ubiquitous environmental toxins that have been linked to damage of the brain and nervous system, especially in young children.

Toxic chemicals are being produced at a rate that is impossible to test for human safety and without a doubt, many of these toxins end up inside our children's bodies making adherence to the Precautionary Principle so much more critical.

Years of study have continued to connect toxic chemicals to many of the "*new*" or "*rising*" health problems we are now seeing in children. Let me remind you of some of the disturbing health trends we have seen in children over the past 30-40 years that should certainly make us wonder "*what has changed*".

There has been a dramatic increase in a range of health conditions over the past few decades including birth defects, childhood cancers, immune disorders, autoimmune diseases, endocrine and reproductive disorder as well as a huge increase in neuropsychiatric problems such as autism, attention-deficit hyperactivity disorder (ADHS) and attention-deficit disorder (ADD).

We are understanding that these increases may relate to a number of factors including overconsumption of the wrong types of foods, lack of proper nutrition, deficient immunological education related to excessive hygiene, overuse of antibiotics, mood regulators and a wide-variety of pharmaceuticals, often used in excess. However, within this list of causative factors is the issue of environmental toxicity and it must be examined carefully.

Birth defects have been increasing -- especially genital defects in boys. Research has also shown a link between the increase in the incidence of hypospadias (urethra does not grow all the way to the tip of the penis during fetal development) and increase in undescended or undersized testicles and exposures to environmental toxins.

There has been a dramatic increase in certain childhood cancers, especially lymphoblastic leukemias and brain cancers; both systems very vulnerable to environment exposures. Although cancer in childhood is rare compared with cancer in adults, it is the second most common cause of death, after injuries and accidents, among children 1 to 19 years of age. Studies have connected the rise in incidence of childhood cancers to exposure to a wide range of toxins in the environment including pesticides.

Asthma is also increasing dramatically, especially in children similarly to the peanut and tree nut allergies which have more than doubled in children. Researchers have recognized that multiple factors need to be considered but environmental toxins remain highly suspect. In the past 20 years it is well established that several environmental pollutants that are found outdoors and indoors exacerbate asthma. Certain environmental factors may also contribute to the development of asthma.

A number of environmental chemicals have been linked to Type 2 Diabetes, a disease that is also becoming dramatically more prevalent in children. This correlates directly with the rise in childhood obesity. A variety of environmental chemicals have come to be referred to as "obesogens". These chemicals interfere with the feedback loop that tells the child that he or she has had enough to eat, so they just keep on eating. These chemicals are also suspected disruptors of a brain-behavior mechanism in metabolism that leads to increased insulin secretion and decreased insulin sensitivity and ultimately puts on more body fat.

Overall, the biggest area of concern in children is the dramatic increase in behavioral and neuropsychiatric problems. A lot of this focus has been on autism, aggressive behaviors and serious mental disorders which has tripled since the early 1990s. Few studies have looked explicitly at the

relationship between ADHD and exposures to environmental contaminants. However, evidence supports a hypothesis that environmental contaminants may contribute to some portion of the incidence of ADHD, based on studies focusing on specific symptoms or types of behavior associated with ADHD. Many studies have found relationships between behavioral problems—including attention problems, hyperactivity, and impulsivity. Along with the increase in ADD and ADHS, there has been a marked increase in depression and bipolar disorders amongst children.

Children are being prescribed antipsychotic medication, antidepressant medications and are often taking several at one time. These powerful medications affect their metabolism in many different ways as well as their quality of life.

This was clearly not the case 30 years ago. We need to ask “why are so many children agitated today requiring all types of medications to calm them down? This is a very sad problem and we all know it has to be addressed. We desperately need to determine the connection between environmental toxins and the dramatic rise in childhood disease and disorders. Never in history have children lived with this kind of total body burden of environmental toxins. Sadly, if we continue in this way, we are participating in conducting a major uncontrolled experiment on our children with no end in sight. This may draw similarities for many of you to the “*canaries in the coal mines*”. This phrase alone serves as an early warning sign of a coming crisis. More specifically, it refers to information that was common knowledge for earlier generations but not addressed.

As we reflect on all the changes in children’s health that have occurred over the past 30-40 years, and recognize the dramatic increase in existing and new children’s diseases and disorders we need to be sure we are not asking “*what is the matter with these children*”. Instead, we need to ask “*what matters to these children*”, and hopefully, this will ethically and morally direct our actions.

My message is that we have to be aware of the problem before we can take action to solve it. In the meantime, applying the “Precautionary Principle” would be a great start. This principle shifts the

"burden of proof" from the general public who are often not aware to those who create public health policies related to environmental risk. We can do something about this issue and it "can" make a difference. Our children's futures are at stake. So, ultimately, this is a message of hope rather than of despair. Hopefully..., it will not fall on deaf ears.

Respectfully submitted by

Joyce M. Woods

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Please see Appendix A - Studies involving exposure to pesticides

In this Appendix, you will see several studies related to pesticides that are on the list of use by the City of Calgary, i.e. glyphosate and dicamba

Appendix A - Studies involving exposure to pesticides

1. In 2015, WHO (World Health Organization) found that there was sufficient evidence of carcinogenicity in

experimental organisms to classify glyphosate, the active ingredient in the most popular lawn care brand

(Roundup) as "probably carcinogenic to humans" (Group 2A). WHO also found that 2,4-D- found in many

'weed and feed' products- is possibly carcinogenic.

[IARC. IARC Monographs Volume 112: evaluation of five organophosphate insecticides and herbicides. 20 march 2015. <http://www.iarc.fr/en/media-centre/iarcnews/pdf/MonographVolume112.pdf>; and IARC. Carcinogenicity of lindane, DDT, and 2,4-dichlorophenoxyacetic acid. The Lancet Oncology, 16(8).p891-892.

2. A 2010 meta-analysis of 15 studies on residential pesticide use and childhood leukemia finds an

association with exposure during pregnancy, as well as to insecticides and herbicides. An association is also

found for exposure to insecticides during childhood.

Turner, M.C., et al. 2010. Residential pesticides and childhood leukemia: a systematic review and meta-analysis. Environ Health Perspect 118(1):33-41

3. A 2013 study suggests that preconception pesticide exposure, and possibly exposure during pregnancy, is associated with an increased risk of childhood brain tumors.

Green KR, Peters S, Bailey HD. 2013) Exposure to pesticides and the risk of childhood brain tumors. Cancer Causes Control. DOI 10.1007/s10552-013-0205-1

4. According to a 2015 study, living in agricultural regions is linked to increased leukemia and central nervous system cancers in children.

Booth BJ, Ward MH, Turyk ME, et al. 2015. Agricultural crop density and risk of childhood cancer in the midwestern United States: an ecologic study. Environmental Health:14(82)

5. A meta-analysis study by scientists at the Harvard University's School of Public Health finds that children's exposure to pesticides in and around the home results in an increased risk of developing certain childhood cancers. Authors found that cancer risks were connected most closely to the type of pesticide used and the location where it was applied.

Chen M, Chi-Hsuan C, Tao L, et al. 2015. Residential Exposure to Pesticide During Childhood and Childhood Cancers: A Meta-Analysis. Pediatrics. DOI: 10.1542/peds.2015-0006

6. The probability of an effect such as cancer, which requires a period of time to develop after exposure, is enhanced if exposure occurs early in life.

Vasselinovitch, S., et al. 1979. "Neoplastic Response of Mouse Tissues During Perinatal Age Periods and Its Significance in Chemical Carcinogenesis," Perinatal Carcinogenesis, National Cancer Institute Monograph 51.

7. A study published by the American Cancer Society finds an increased risk for non-Hodgkin's lymphoma

(NHL) in people exposed to common herbicides and fungicides, particularly the weedkiller mecoprop

(MCPPE). People exposed to glyphosate (Roundup®) are 2.7 times more likely to develop NHL.

Hardell, L., et al. 1999 Mar. "A Case-Control Study of Non-Hodgkins Lymphoma and Exposure to Pesticides," J of the Am Cancer Soc, (85):6. p.1353.

8. 75 out of all 99 human studies done on lymphoma and pesticides find a link between the two.

Osburn, S. 2001. Do Pesticides Cause Lymphoma? Lymphoma Foundation of America, Chevy Chase, MD.

9. Four peer-reviewed studies demonstrate the ability of glyphosate-containing herbicides to cause genetic

damage to DNA (mutagenicity), even at very low concentration levels.

Cox C. 2004 Winter. "Glyphosate." Journal Of Pesticide Reform Vol. 24 (4).

10. A 2007 study published in Environmental Health Perspectives finds that children born to mothers living

in households with pesticide use during pregnancy had over twice as much risk of getting cancer, specifically

acute leukemia (AL) or non-Hodgkin lymphoma (NHL).

Rudant, J. et al. 2007. Household Exposure to Pesticides and Risk of Childhood Hematopoietic Malignancies: The ESCALE Study (SFCE). Environ Health Perspect. 115:1787-1793.

11. A 2007 Canadian report shows that a greater environmental risk exists for boys, specifically when it comes to cancer, asthma, learning and behavioral disorders, birth defects and testicular dysgenesis syndrome.

Canadian Partnership For Children's Health and Environment. 2007. A Father's Day Report - Men, Boys And Environmental Health Threats. www.healthyenvironmentforkids.ca.

12. Children, asthma and pesticides. Researchers find that pesticides may increase the risk of developing

asthma, exacerbate a previous asthmatic condition or even trigger asthma attacks by increasing bronchial

hyper-responsiveness.

Hernández, AF, Parrón, T. and Alarcón, R. 2011. Pesticides and asthma. Curr Opin Allergy Clin Immunol. 11(2):90-6

13. One 2015 farmworker study found an association between early-life exposure to OPs and respiratory symptoms consistent with possible asthma in childhood.

Raanan R, Harley KG, Balmes JR, et al. 2015. Early-life exposure to organophosphate pesticides and pediatric respiratory symptoms in the CHAMACOS cohort. Environ Health Perspect. 123(2):179-85.

14. A 2012 study concluded that prenatal PBO exposure was associated with childhood cough in inner city children.

Liu B, Jung KH, Horton MK, et al. 2012. Prenatal exposure to pesticide ingredient piperonyl butoxide and childhood cough in an urban cohort, Environ Int. 48:156-61.

15 . A 2004 study finds that young infants and toddlers exposed to herbicides (weedkillers) within their first

year of life are 4.5 times more likely to develop asthma by the age of five, and almost 2.5 times more likely when exposed to insecticides.

Salam, MT, et al. 2004. "Early Life Environmental Risk Factors for Asthma: Findings from the Children's Health Study." Environmental Health Perspectives 112(6): 760.

16. EPA material safety data sheets for the common herbicides 2,4-D, mecoprop, dicamba, (often combined

as Trimec®) and glyphosate (Roundup®) list them as respiratory irritants that can cause irritation to skin and

mucous membranes, chest burning, coughing, nausea and vomiting.

17. Scientists believe that the amount of toxic chemicals in the environment that cause developmental and

neurological damage are contributing to the rise of physical and mental effects being found in children.

National Research Council. 2000. *Scientific frontiers in developmental toxicology and risk assessment*. Washington, DC: National Academy Press; Physicians for Social Responsibility, The National Environmental Trust, and the Learning Disabilities Association of America. 2000. *Polluting our future: Chemical pollution in the U.S. that affects child development and learning*. http://www.net.org/health/tri_report.pdf (accessed 6/2/05).

18. According to researchers at the University of California Berkeley School of Public Health, exposure to

pesticides while in the womb may increase the odds that a child will have attention deficit hyperactivity disorder (ADHD).

Marks AR, Harley K, Bradman A, Kogut K, Barr DB, Johnson C, et al. 2010. *Organophosphate Pesticide Exposure and Attention in Young Mexican-American Children: The CHAMACOS Study*. *Environ Health Perspect* 118:1768-1774.

19. Studies show children's developing organs create "early windows of great vulnerability" during which

exposure to pesticides can cause great damage.

Landrigan, P.J., L Claudio, SB Markowitz, et al. 1999. "Pesticides and inner-city children: exposures, risks, and prevention." *Environmental Health Perspectives* 107 (Suppl 3): 431-437.

20. A Beyond Pesticides Fact Sheet (such as "weed and feed" products) tested on mice show increased risk of infertility, miscarriage and birth defects at very low dosages.

Greenlee, A. et al. 2004. "Low-Dose Agrochemicals and Lawn-Care Pesticides Induce Developmental Toxicity in Murine Preimplantation Embryos," *Environmental Health Perspectives* 112(6): 703-709; Cavieres, M., et al. 2002. "Developmental toxicity of a commercial herbicide mixture in mice: Effects on embryo implantation and litter size." *Environmental Health Perspectives* 110:1081-1085.

21. Results from a CHARGE study finds that agricultural exposures to organophosphates at some point during gestation was associated with a 60% increased risk for autism higher for third-trimester exposures,

and second-trimester chlorpyrifos applications. Similarly, children of mothers residing near pyrethroid insecticide applications just before conception or during third trimester were at greater risk for both autism

and developmental delay.

Shelton, Geraghty, Tancredi. 2014. Neurodevelopmental Disorders and Prenatal Residential Proximity to Agricultural Pesticides: The CHARGE Study. Environmental Health Perspectives:122(10).

22. Researchers at the Cincinnati Children's Hospital Medical Center found an association between increasing pyrethroid pesticide exposure and ADHD which they conclude may be stronger for symptoms seen in boys compared to girls.

Wagner-Schuman, M, Richardson, J, Auinger, P et al. 2015. Association of pyrethroid pesticide exposure with attention-deficit/hyperactivity disorder in a nationally representative sample of U.S. children. Environmental Health. 14:44

23. Additional studies on lawn pesticide product formulations show effects on learning ability, aggressiveness, memory, motor skills and immune system function.

Porter, W. 2004 Spring. "Do Pesticides Affect Learning and Behavior? The neuro-endocrine-immune connection," Pesticides and You, Beyond Pesticides 21(4): 1115; Shettler, T., et al. 2000. "Known and suspected developmental neurotoxicants," In Harms Way: Toxic Threats to Child Development, Greater Boston Physicians for Social Responsibility: Cambridge, MA; Mitchell, J. et al. 1989. "The Behavioral Effects of Pesticides in Male Mice," Neurotoxicology and Teratology 11: 45-50.

24. A 2002 study finds children born to parents exposed to glyphosate (Roundup®) show a higher incidence of attention deficit disorder and hyperactivity.

Cox C. 2004. Journal Of Pesticide Reform Vol. 24 (4) citing: Garry, V.F. et al. 2002. "Birth defects, season of conception, and sex of children born to pesticide applicators living in the Red River Valley of Minnesota." Environmental Health Perspectives 110 (Suppl. 3):441-449.

25. In a 2004-2005 review of 2,4-D, EPA finds that, "there is a concern for endocrine disruption."

EPA. 2004 June. 2,4-D. HED's Human Health Risk Assessment for the Reregistration Eligibility Decision (RED). p7.

26. Children ages 6-11 nationwide have significantly higher levels of pesticide residues in their bodies than all other age categories.

Centers for Disease Control and Prevention. 2003 Jan. Second National Report on Human Exposure to Environmental Chemicals

27. Biomonitoring testing in Canada finds residues of lawn pesticides, such as 2,4-D and mecoprop, in 15 percent of children tested, ages insecticides are present in 98.7 percent of children tested.

Valcke, Mathieu, et al. 2004. "Characterization of exposure to pesticides used in average residential homes with children ages 3 to 7 in Quebec." Nat Inst of Public Health, Québec. www.inspq.qc.ca/pdf/publications/319-CharacterisationPesticidesEnfants.pdf (accessed 6/2/05).

28. One 2014 analysis of 129 preschool children, ages 20 to 66 months, found that children were exposed to

indoor concentrations of pyrethroids, organophosphates and organochlorines pesticides which were detected in soil, dust and indoor air.

Morgan, M, Wilson, N, and Chuang C. 2014. Exposures of 129 Preschool Children to Organochlorines, Organophosphates, Pyrethroids, and Acid Herbicides at Their Homes and Daycares in North Carolina. Int. J. Environ. Res. Public Health, 11(4), 3743-3764

29. Samples from 120 Cape Cod homes, where elevated incidence of breast, colorectal, lung, and prostate cancers are reported, find high indoor air and dust concentrations of carbaryl, permethrin, and 2,4-D.

Rudel, Ruthann, et al. 2003. "Phthalates, Alkylphenols, Pesticides, Polybrominated Diphenyl Ethers, and Other Endocrine-Disrupting Compounds in Indoor Air and Dust." Environmental Science and Technology 37(20): 4543-4553.

30. A study published in Environmental Health Perspectives found that children who eat a conventional diet of food produced with chemical-intensive practices carry residues of organophosphate pesticides that are reduced or eliminated when they switch to an organic diet.

Lu, C. et al. 2008. Dietary Intake and Its Contribution to Longitudinal Organophosphorus Pesticide Exposure in Urban/Suburban Children. Environmental Health Perspectives doi:10.1289/ehp.10912 available via <http://dx.doi.org/>.

31. Scientists at the California Department of Public Health found that 28% of the mothers studied who

lived near fields in the Central Valley, which were sprayed with organochlorines, such as endosulfan and dicofol, have children with autism.

Roberts, C. et al. 2007. Maternal Residence Near Agricultural Pesticide Applications and Autism Spectrum Disorders among Children in the California Central Valley. Environmental Health Perspectives 115(10)

32. A 2005 study published in the Journal of the American Medical Association found that students and school employees are being poisoned by pesticide use at schools and from drift off of neighboring farmlands.

Alarcon, WA. et al. 2005. Acute illnesses associated with pesticide exposure at school. J Am Medical Association 294(4); 455-465.

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See also: <http://www.epa.gov/pesticides/food/pest.htm>.

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children's susceptibility to environmental toxicants."

Environmental Health Perspectives. 108(suppl 1):13-21.

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JUN 07 2017

ITEM: 4.2 CPS2017-0510
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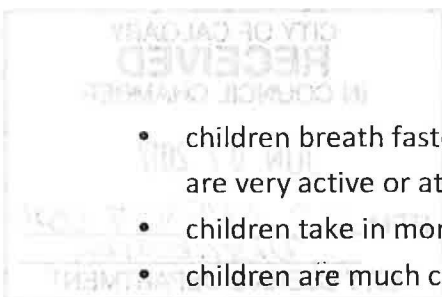
**Chairman Gian-Carra Carlo and members of the Standing Policy Committee of
Community and Protective Services**

RE: Pesticide Toxicity Report – CPS 2017-0510, June 7, 2017

First of all, it is so encouraging to hear that the City of Calgary Council is evaluating pesticide toxicity with the goal of eliminating the use of the more toxic pesticides on City-owned land. Calgary has been criticized in the past for not protecting its citizens from toxic pesticides despite the awareness that these chemicals have long been linked to many developmental and health issues with children including cancer. Of greatest concern for me is the impact these chemicals have on children's health and am pleased to submit my position as a concerned citizen, a long-standing health care worker, a university educator, an author, a mother, grandmother and an Advisory Board member for the Coalition for a Healthy Calgary. I will speak from the position of having studied the impact of toxic chemicals on our health with a special interest in children's health. I have authored a book called "Indoor Air Pollution... The Silent Killer" and developed two courses for Mount Royal University. The first course was entitled "Children's Environmental Health" which was developed for Continuing education and the second is called Integrative Healing Practices and speaks to environmental impacts on health. This second course is delivered in the fourth year of the Nursing Program and the Integrative Health Coach Program for Continuing Education. I spent many years presenting seminars throughout North America on environmental wellness, served on the Advisory Board for the Integrative Health Institute at Mount Royal University for seven years, and am listed on the Experts Directory at Mount Royal University to address issues identified by the community for environmental concerns. I have been employed by Mount Royal University for seventeen years as an Associate Professor, Department of Nursing and Midwifery.

Let me begin by stressing how much scientific evidence is now available to support the long standing belief of many researchers that pesticide use has both immediate and long-term impact on human health, and especially the health of children. Please consider the following facts when making any decision related to pesticide use for the City of Calgary:

- children are at a very immature stage of neurological development. We have known for some time that the blood brain barrier does not fully close until about the age of two and scientific evidence further suggests that the brain is not fully developed until about the age of 12. Exposure to toxic pesticides during this time may greatly impact the development of the nervous system resulting in numerous health and behavioural problems
- children have a greater skin surface for their size compared to adults so absorb proportionally greater amount of all toxic substances they are exposed to through their lungs and intestinal tracts

- 
- children breath faster than adults so take in more air. This is further enhanced when they are very active or at play
 - children take in more food and water per kilo than adults
 - children are much closer to the ground than adults and often engage in activities that have direct contact with the ground and grass.
 - very young children tend to put their hands or other things in their mouths which further increases their exposure to toxic pesticides
children do not fully develop their immune systems or detoxifying mechanisms until early teenage years greatly reducing their ability to fight the introduction of toxic pesticides into their systems
 - cancer continues to be the leading cause of death by disease past infancy among children -- leading the way are leukemia and brain cancer, both areas of the body that are extremely vulnerable to exposures in the environment.

It is this combination of increased exposure to pesticides and the lack of defenses related to bodily development to combat the toxic effects of pesticides that puts children at such a high risk.

In making your decision regarding pesticide use, allow me to bring your attention to the ***"Precautionary Principle"*** or sometimes referred to as the "precautionary approach" to risk management which clearly states that if ***"an action or policy has a suspected risk of causing harm to the public, or to the environment, in the absence of scientific consensus the "burden of proof" that it is NOT harmful falls on those taking that action.***

This is the principle that is used by policy makers to justify discretionary decisions in situations where there is the ***"possibility of harm"*** from making a certain decision such as taking or choosing a particular course of action, when extensive scientific knowledge on the matter is lacking. The principle implies that there is a ***"social responsibility"*** to protect the public from exposure to harm, when scientific investigation has found a plausible risk. These protections can be relaxed **ONLY** if further scientific findings emerge that provide sound evidence that no harm will result. To date, that evidence has not been made available to us.

I would like to leave you with 46 recent and relevant scientific studies related to pesticide exposure that should definitely make you question the safety, and ask that you please consider them carefully. The main theme of each study has been identified.

Thank you,

Respectfully submitted by:

Joyce M. Woods, RN, BN, B.A.(Spec.) M.Ed, PhD.

Recent and relevant scientific studies related to pesticide exposure

- In 2015, WHO found that there was sufficient evidence of carcinogenicity in experimental organisms to classify glyphosate, the active ingredient in the most popular lawn care brand (Roundup) as “probably carcinogenic to humans” (Group 2A). WHO also found that 2,4-D found in many ‘weed and feed’ products is possibly carcinogenic (10).
- A 2010 meta-analysis of 15 studies on residential pesticide use and childhood leukemia finds an association with exposure during pregnancy, as well as to insecticides and herbicides. An association is also found for exposure to insecticides during children (11).
- A 2013 study suggests that preconception pesticide exposure, and possibly exposure during pregnancy, is associated with an increased risk of childhood brain tumors (12).
- According to a 2015 study, living in agricultural regions is linked to increased leukemia and central nervous system cancers in children (13).
- The National Academy of Sciences reports that children are more susceptible to chemicals than adults and estimates that 50% of lifetime pesticide exposure occurs during the first five years of life (1).
- EPA concurs that children take in more pesticides relative to body weight than adults and have developing organ systems that are more vulnerable and less able to detoxify toxic chemicals (2).
- Infants crawling behavior and proximity to the floor account for a greater potential than adults for dermal and inhalation exposure to contaminants on carpets, floors, lawns, and soil (3).
- Children with developmental delays and those younger than six years are at increased risk of ingesting pesticides through non-food items, such as soil (4).
- Pre-natal exposure to the herbicide atrazine are associated with fetal growth restriction and small head circumference and fetal growth restriction (5).
- A 2010 analysis observed that women who use pesticide in their homes or yards were two times more likely to have children with neural tube defects than women without these reported exposures (6).
- Studies find that pesticides such as the weedkiller 2,4-D pass from mother to child through umbilical cord blood and breast milk (7).
- Consistent observations have led investigators to conclude that chronic low-dose exposure to certain pesticides might pose a hazard to the health and development of children (8).
- The World Health Organization (WHO) cites that over 30% of the global burden of disease in children can be attributed to environmental factors, including pesticides (9).
- A meta-analysis study by scientists at the Harvard University’s School of Public Health finds that children’s exposure to pesticides in and around the home results in an increased risk of developing certain childhood cancers. Authors found that cancer risks were connected most closely to the type of pesticide used and the location where it was applied (14).

- The probability of an effect such as cancer, which requires a period of time to develop after exposure, is enhanced if exposure occurs early in life (15).
- A study published in the Journal of National Cancer Institute finds that household and garden pesticide use don't mix.
- Use of toxic pesticides increase the risk of childhood leukemia as much as seven-fold (16).
- Studies show that children living in households where pesticides are used suffer elevated rates of leukemia, brain cancer and soft tissue sarcoma (17).
- Pesticides can increase susceptibility to certain cancers by breaking down the immune system's surveillance against cancer cells. Infants and children, the aged and the chronically ill are at greatest risk from chemically-induced immune suppression (18).
- A study published by the American Cancer Society finds an increased risk for non-Hodgkin's lymphoma (NHL) in people exposed to common herbicide and fungicides, particularly the weedkiller mecoprop (MCPP). People exposed to glyphosate (Roundup®) are 2.7 times more likely to develop NHL (19).
- 75 out of all 99 human studies done on lymphoma and pesticides find a link between the two (20).
- Four peer-reviewed studies demonstrate the ability of glyphosate-containing herbicides to cause genetic damage to DNA (mutagenicity), even at very low concentration levels (21).
- A 2007 study published in Environmental Health Perspectives finds that children born to mothers living in households with pesticide use during pregnancy had over twice as much risk of getting cancer, specifically acute leukemia (AL) or non-Hodgkin lymphoma (NHL) (22).
- A 2007 Canadian report shows that a greater environmental risk exists for boys, specifically when it comes to cancer, asthma, learning and behavioral disorders, birth defects and testicular dysgenesis syndrome (23). This correlates with figures shown on the greater number of boys who experience learning and behavioural disorders such as ADD and ADHD.
- Researchers find that pesticides may increase the risk of developing asthma, exacerbate a previous asthmatic condition or even trigger asthma attacks by increasing bronchial hyper-responsiveness (24).
- One 2015 farmworker study found an association between early-life exposure to OPs and respiratory symptoms consistent with possible asthma in childhood (25).
- A 2012 study concluded that prenatal PBO exposure was associated with childhood cough in inner city children (26).

- A 2004 study finds that young infants and toddlers exposed to herbicide (weedkillers) within their first year of life are 4.5 times more likely to develop asthma by the age of five, and almost 2.5 times more likely when exposed to insecticides (27).
- EPA material safety data sheets for the common herbicides 2,4-D, mecoprop, dicamba, (often combined as Trimec® and glyphosate (Roundup®) list them as respiratory irritants that can cause irritation to skin and mucous membranes, chest burning, coughing, nausea and vomiting.
- Roughly one in six children in the U.S. has one or more developmental disabilities, ranging from a learning disability to a serious behavioural or emotional disorder (28).
- Scientists believe that the amount of toxic chemical in the environment that cause developmental and neurological damage are contributing to the rise of physical and mental effects being found in children (29).
- According to researchers at the University of California Berkeley School of Public Health, exposure to pesticides while in the womb may increase the odds that a child will have attention deficit hyperactivity disorder (ADHD) (30).
- Studies show children's developing organs create "early window of great vulnerability" during which exposure to pesticides can cause great damage (31).
- Lawn pesticide products containing herbicides and fertilizers (such as "weed and feed" products) tested on mice show increased risk of infertility, miscarriage and birth defects at very low dosages (32).
- Results from a CHARGE study finds that agricultural exposures to organophosphates at some point during gestation was associated with a 60% increased risk for autism higher for third-trimester exposures, and second-trimester chlorpyrifos applications. Similarly, children of mothers residing near pyrethroid insecticide applications just before conception or during third trimester were at greater risk for both autism and developmental delay (33).
- Researchers at the Cincinnati Children's Hospital Medical Center found an association between increasing pyrethroid pesticide exposure and ADHD which they conclude may be stronger for symptoms seen in boys compared to girls (34).
- Additional studies on lawn pesticide product formulations show effect on learning ability, aggressiveness, memory, motor skills and immune system function (35).
- A 2002 study finds children born to parents exposed to glyphosate (Roundup®) show a higher incidence of attention deficit disorder and hyperactivity (36).
- A study of 210,723 live births in Minnesota farming communities finds children of pesticide applicators have significantly higher rates of birth defects than the average population (37).

- In a 2004-2005 review of 2,4-D, EPA finds that, "there is a concern for endocrine disruption." (38)
 - Children ages 6-11 nationwide have significantly higher levels of pesticide residues in their bodies than all other age categories (39).
 - Biomonitoring testing in Canada finds residues of lawn pesticides, such as 2,4-D and mecoprop, in 15% of children tested, ages three to seven whose parents had recently applied the lawn chemicals. Breakdown products of organophosphate insecticides are present in 98.7% of children tested (40).
 - Scientific studies show that 2,4-D applied to lawns drifts and is tracked indoors where it settles in dust, air and surfaces and may remain for up to a year in carpets (41).
 - One 2014 analysis of 129 preschool children, ages 20 to 66 months, found that children were exposed to indoor concentrations of pyrethroids, organophosphates and organochlorine pesticides which were detected in soil, dust and indoor air (42).
 - Samples from 120 Cape Cod homes, where elevated incidence of breast, colorectal, lung, and prostate cancers are reported, find high indoor air and dust concentrations of carbaryl, permethrin, and 2,4-D (43).
 - A study published in Environmental Health Perspectives found that children who eat a conventional diet of food produced with chemical-intensive practices carry residues of organophosphate pesticides that are reduced or eliminated when they switch to an organic diet (44).
 - Scientists at the California Department of Public Health found that 28% of the mothers studies who lived near fields in the Central Valley, which were sprayed with organochlorines, such as endosulfan and dicofol, have children with autism (45).
 - A 2005 study published in the Journal of the American Medical Association found that students and school employees are being poisoned by pesticide use at schools and from drift off of neighborin farmlands (46).
- Hopefully, these studies will help us recognize the importance of using alternatives to reduce exposure to toxic chemicals by adopting sound organic or integrates pest management (IPM) practices that use cultural, mechanical and biological methods of control and "least-toxic" chemicals only as a last resort.

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**EVALUATION OF INTEGRATED PEST MANAGEMENT IN CALGARY
PESTICIDE TOXICITY, IMPACTS ON HUMAN HEALTH
AND THE ENVIRONMENT, AND BEST PRACTICES**

Submitted by:

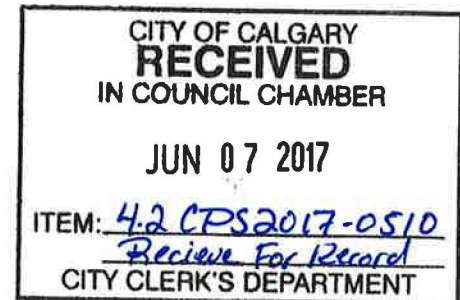
**COALITION FOR A HEALTHY CALGARY
AND
PREVENT CANCER NOW**

**TO
THE CITY OF CALGARY**

FEBRUARY 10, 2017

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This submission was prepared in response to an email solicitation to the *Coalition for a Healthy Calgary* dated December 7, 2016.

About Us

The *Coalition for a Healthy Calgary* (Healthy Calgary) is a registered, nonprofit society incorporated under the Societies Act of Alberta. It was formed in April 2007 in response to concerns regarding the use of pesticides, particularly in areas where children play. A coalition of citizens, health care professionals, scientists, landscaping and horticultural professionals and health and environmental organizations, Healthy Calgary continues the work of two previous organizations, Lawns for Kids and Pesticide Free Yards of the Sierra Club, that were active through the 1980s to the early years of 2000.

Prevent Cancer Now (PCN) is a national civil society organization, incorporated in 2007. It is broad-based, including scientists and medical professionals, labour, educational representatives, as well as concerned citizens from all walks of life, working to eliminate contributors to cancer (and other chronic conditions). PCN Chair, Meg Sears PhD, has twice addressed Calgary councillors to discuss pesticides and least-toxic options for landscaping, and is grateful to Healthy Calgary for notice of this consultation.

INTRODUCTION

Healthy Calgary and PCN welcome the opportunity provided by Councillor Pincott's motion in Council to direct Administration to include health organizations and expertise in the review of the City of Calgary's Integrated Pest Management Plan (IPMP). This is the first review of the plan since adoption in 1998, and we look forward to active participation in the review.

Healthy Calgary and PCN prepared this joint submission to City of Calgary, Parks. Both of our organizations share a common goal – to see adopted “common sense measures” whereby only the least-toxic pest control strategies are used on public and private green spaces in Calgary, while pesticides not identified as least-toxic can be used only if alternative methods have been exhausted and their application is deemed necessary to address an imminent threat to public health.

Pesticides are devised and used specifically to disrupt biological processes, so achieving pest control using least-toxic options in highly populated environments is “low hanging fruit” to protect public health. Thus, we commend Calgary Council for considering human and ecological health in the current review of Integrated Pest Management (IPM) on City Lands, and welcome the opportunity to contribute our perspectives.

In this joint submission Healthy Calgary offers the local and historical context of the mission to adopt least-toxic measures to manage landscapes in Calgary. PCN brings a depth of experience and scientific expertise on the evaluation of pesticide toxicity and human health impacts.

Two limitations of this submission are that the City of Calgary's pesticide use has not been reported and only limited information was provided; and that full review of health and environmental impacts of these chemicals (and probable but undisclosed combinations) would be

a more lengthy endeavor than is possible here.

Thus this joint submission is to provide the City of Calgary, as requested in the solicitation of December 7, 2017, an expert opinion and rationale (while acknowledging the above caveats) regarding:

1. The current perceptions and practices of pesticides as a tool to control legislated weeds and pests, to protect City assets and to ensure human health and safety in an urban environment;
2. Pesticide toxicity, as it relates to human and environmental health; and
3. Measures that can be employed to shift to least-toxic pest control options.

SECTION 1

CURRENT PERCEPTIONS AND PRACTICES OF PESTICIDES AS A TOOL TO CONTROL LEGISLATED WEEDS AND PESTS, TO PROTECT CITY ASSETS AND TO ENSURE HUMAN HEALTH AND SAFETY IN AN URBAN ENVIRONMENT

Pesticides as a tool to control legislated weeds and pests to protect city assets and human health and safety – perceptions and practices

In 1998 the City of Calgary adopted Integrated Pest Management (IPM) as a program of practice to manage and protect City assets from pests. IPM requires quantitative monitoring of pests, with various strategies to achieve targets. Horticultural practices (informed by soil testing) are used to optimize growing conditions for desired species, while conditions are made less favourable for undesired species. Careful records are maintained to identify more and less successful strategies, and to track progress year to year. More toxic pesticides are used only when necessary to protect public health (Ontario permits glyphosate or glufosinate only to protect public health, for example from poison ivy).

Low standard of integrated pest management application and implementation

Without reports on targeted, relevant pests, it is difficult to gauge the City's use of pesticides to control legislated weeds and pests while ensuring human health and safety. Lack of response to repeated information requests as to how much of which pesticides have been sprayed when and where, suggests that key data collection and analysis is lacking. The only complete data set received, many years ago, was for 2005. Calls to 311 and to the City's IPM leads, formerly James Borrow, and currently Lincoln Julie, have gone unheeded.

Making pesticide data available to the public is a basic feature of an excellent IPM program. Past history of pesticide use should be readily available upon request without resorting to a Freedom of Information Request. The only conclusions that may be drawn is that either the City records

are in disarray contrary to IPM and provincial regulations, and/or the City is reluctant to inform the citizens of Calgary, thereby denying them their right to know.

Outdated and hazardous pesticides still used

A plethora of least-toxic alternatives have been identified within Ontario's pest control product lists (Appendix 1), but Calgary continues to use many chemicals that pose extensive health and environmental hazards – these include persistent chemicals that Health Canada only permits in remote areas, away from populations (e.g. picloram, aminopyralid, clopyralid, amitrol). Without fundamental features of true IPM, it is unclear how Calgary's program meets the standard. We can only conclude that the fundamentals of IPM are not followed by the City of Calgary, given the inability of staff and contractors to make least-toxic choices for pest control.

Inappropriate responses to innocuous plants – “cosmetic” pesticide use

The question is posed regarding “legislated” weeds and pests, whereas the focus of Calgary's public opinion survey and Administration's report is on dandelions. Dandelions are not included on the Alberta Provincial Weed List as a prohibited or restricted noxious weed. It was determined that dandelions do not pose an economic, health or environmental risk, which is consistent with other Canadian jurisdictions. If dandelions are not an economic, health or environmental risk, then spraying dandelions fits the definition of *cosmetic use of pesticides*; the use of pesticides to improve the aesthetics of the landscape with no countervailing health benefit.

Claims by Administration that cosmetic and blanket spraying does not occur are countered by well-documented observations of trucks equipped with sprayers along roadways in particular, and in parks. Councillor Pincott noted the amount of roadway spraying at the Meeting of Council November 28, 2016, and was curious as to the process/steps undertaken to arrive at the use of toxic chemicals to control a non-regulated weed under the City's Integrated Pest Management Program (IPMP). Similar to Councillor Pincott, Healthy Calgary and PCN are also curious as to the occurrence of plant counts, soil testing, soil amendment applications, deeper and quality topsoil additions, over-seeding, slit seeding, aeration and watering to promote and establish more “desirable” vegetation. Spraying without horticultural follow-up amounts to simply clearing the surface for another round of germination.

Thus the perception exists that pesticides are the first line of defense in the City's IPM tool kit. The proliferation of signage beginning late spring through to October points to the City doing little more than applying herbicides to control weeds. Although this perception may be erroneous, awareness of alternative least-toxic methods of pest control has taken the form of small trials (e.g. goats) rather than instituting alternative practices as the status quo. Signage, plus the lack of information to the contrary, leaves the public to conclude the obvious – reliance on pesticide spraying.

Calgary uses herbicides banned elsewhere

It is clear to Healthy Calgary, citizens of Calgary and particularly visitors from other provinces, that the City of Calgary does *not* use pesticides to control *only* legislated weeds that pose

immediate risks to human health and the environment. The City is perceived to rely heavily on herbicides to control dandelions, despite serious concerns for health when these toxic chemicals are used in an urban environment. In fact a call to IPM revealed that the dandelion is used as a proxy for broadleaf weeds. It is not known, however, whether the proxied, broadleaf weeds require control or eradication under the Alberta Weed Control Act. The chemicals of choice are 2,4-D, mecoprop and dicamba which are banned for “cosmetic” uses for a majority of Canadians.

Dandelions are a concern of a minority of Calgarians

The City’s commissioned survey on Citizens Attitudes towards Dandelions (August 2016) revealed that only 36% of the population is concerned about dandelions. The survey indicates that that segment of the population tend to be older, retired and homeowners. The same survey found that 25% of Calgarians don’t care about dandelions and 34% of Calgarians are neutral regarding dandelions. This illustrates that Administration is responding to a small minority of the population using, more often than not, toxic chemicals to control dandelions – not legislated weeds. Although 50% of Calgarians believe that the City uses chemicals to control dandelions, when provided with a choice of techniques, 80% to 87% of respondents preferred less harmful methods such as naturalization, goats, and turf removal.

An August 2016 Alberta Pesticide Survey, by OraclePoll Research, commissioned by PCN and the Canadian Association of Physicians for the Environment, supports the above. Two-thirds of Albertans responded that pesticides used for lawns and gardens pose a threat to children’s health. A majority of Albertans, 62%, said they would support a law that phases out the use and sale of all but the safest pesticides for lawns and gardens in Alberta. The youngest residents of the Province (18-34 years) were most likely to support the proposed legislation at 70%.

Dandelions have become politicized, science dismissed

Counting complaint calls is a most unscientific method to determine the use of chemicals that may harm human health and the environment. Politicians are responding to citizen complaints and votes – not science. There is no mechanism available to record dandelion complaints, specifically, when calling 311. The Community Standards Bylaw 5M2004 refers to long grasses and herbaceous plants with no specification except for height. Administration equated 311 bylaw complaints with dandelions, with no methodology to validate this conclusion. Direct complaints to Councillors were also included in the overall numbers but not made public. On the other hand, complaints about spraying were not mentioned.

Despite informed advice from Administration that a \$1.7 million dollar extra mowing program would do little to control dandelions Council voted in favour of the program. After one extra mowing cycle the program was cancelled.

Pesticides are registered for use by Health Canada so they must be ok

Many people believe that Health Canada’s Pest Management Regulatory Agency (PMRA) is protecting the health of Canadians via the assessment and registration of pesticides. As long as directions are followed the risks associated with pesticide use are reduced to an “acceptable” level. Some directions may prove difficult to achieve (e.g. prolonged periods before re-entry of a

sprayed property, prohibition of soil disturbance for prolonged periods following use of some pesticides, and personal instructions to avoid skin contact and inhaling); however IPM practitioners, pesticide applicators and the pesticide industry are quick to assert that Canada has one of the best regulatory agencies in the world.

Unfortunately we cannot rely upon Health Canada's PMRA, as experience has identified important gaps regarding protection of public health and pesticides.

Scientific limitations of Canadian federal pesticide regulation

The Pest Management Regulatory Agency (PMRA) regulates products that destroy or control pests, under the Pest Control Products Act (PCPA).¹ A "pest" is an organism that is "harmful, noxious or troublesome."

The PMRA and the health and medical community reach opposite conclusions regarding pesticides and human health. The doctors, who urge precautionary minimization of exposures, rely upon the real-life human epidemiological research rather than the confidential industry-produced animal test data relied upon by the PMRA. The PMRA conducts virtually no testing itself. Rather, it conducts a paper audit of data submitted by the pesticide manufacturers.

Unfortunately, its assessment of human risk is flawed, for the following reasons:

1. **High dose animal testing in labs is of limited relevance for people.** Testing determines the maximum dose that does not make an animal (usually a rodent such as a rat or mouse) seriously ill. Rodents are different from humans, in that they have enzymes that help them metabolize poisons. Humans do not have the same enzymes and, of course, tests are not conducted on humans. That would be unethical.
Also, tests do not generally cover the animal's lifespan. In humans, exposures that may cause no symptoms in the mother can cause life-long harm to her unborn child, and childhood exposures can cause symptoms in adulthood. Some effects may be passed through generations due to changes in gene expression, called epigenetic effects.
2. **Tests do not address low dose or cumulative effects, as they build up with multiple exposures and over time.** In fact, the regulatory system actually dissuades companies from doing low dose, environmentally relevant testing, because any positive findings would preclude the product being registered. This highlights the need for independent research. Some health effects occur at doses commonly encountered in the environment, effects that may predispose people to cancers as well as other major chronic diseases. One important mechanism by which this happens is endocrine disruption.
3. **No testing is done on endocrine disruption – an important mechanism behind many pesticides' chronic toxicities.** Many pesticides disrupt the endocrine, or hormone systems.² Hormones orchestrate every step of development from gestation through the entire lifespan. They act at extremely low concentrations in the body, and endocrine disrupting chemicals can have different, even opposite effects at higher doses.³ Alterations to hormone levels

during critical windows of development can cause permanent changes to children's lives, affecting their intelligence and behaviour, and making them more susceptible to infections, asthma, obesity, diabetes, reproductive failure, cardiovascular disease and cancers. One 2011 study reviewed endocrine effects of 91 pesticides.² A second study confirmed previously known androgen effects of some pesticides,⁴ while among previously untested pesticides nine were anti-androgenic and seven were androgenic. The US Environmental Protection Agency and the European Union are screening pesticides for effects related to actions of estrogen, androgen, thyroid and other hormones. A 2012 review of 845 scientific papers showed evidence that endocrine-disrupting chemicals have adverse health impacts at very low doses in animals and humans.⁵

4. **Only active ingredients are tested.** Additives or “formulants” are used in pesticide products to slow metabolism of the active ingredient (i.e., prolong its effect), and to improve spreading and absorption of the active ingredient. Additives can do the same when pesticides contact humans. A 2014 study found that 8 of 9 common commercial products tested were hundreds of times more toxic to human cells than just the pesticide active ingredient without formulants.⁶
5. **Pesticides are not tested in combination.** While we know that chemicals can act very differently in combination, only single chemicals are assessed in isolation.
6. **Pesticide registration is based on all directions being followed.** Even if people make the effort to access the label fine print, instructions are extremely difficult to follow. For example: “avoid inhaling”; “avoid contact with the skin or eyes”; and “apply only when there are no children, pregnant women, elderly persons, pets or animals present.”
7. **The PMRA does not take into account much of the medical literature.** Real-life study of the effects of pesticides is difficult, and the PMRA dismisses all of this information as showing only correlation but not the level of causation required before taking action. The PMRA is of the opinion that it is virtually impossible to *prove* that chronic pesticide exposures cause harm to humans. This leaves the federal regulator relying upon industry-supplied high dose animal testing.
8. **A perverse effect of the regulatory framework is that companies are dissuaded from testing at ecologically relevant levels.** Pesticide registration hinges upon application of several “extrapolation factors” and environmentally relevant testing may result in denial of registration.

Federal audits of Health Canada's pesticide management

The Federal Commissioner of the Environment in the 2015 audit of pest control products found glaring deficiencies and concerns regarding pesticide registration.⁷ Some concerns are as follows:

- PMRA had made little progress since the 2008 audit to limit the duration of some conditional registrations (when pesticide sales are permitted pending further information

to complete the assessment). Eight of nine products that had been registered conditionally for a decade or more were neonicotinoids, a class of neurotoxic insecticides that have been linked to Bee Colony Collapse Disorder and the death of other pollinators and aquatic species.

- Under conditional registrations the PMRA permits use of the pesticide without having received and assessed the risk and value assessments to determine the impacts on human health and the environment. At the time 80 out of 7,000 pesticide products were conditionally registered. None of industry studies are available to the public until the pesticide is fully registered, and even then an individual must personally visit offices in Ottawa and record relevant information with pen and paper.
- PMRA has never exercised its authority to cancel a conditional registration when a registrant has failed to satisfy conditions of registration, within a five-year period.
- Re-evaluations of older pesticides are behind schedule.
- Cumulative health impacts have not been addressed when required in the re-evaluations of pesticides.
- It took the filing of a lawsuit before the PMRA began to consider whether special reviews were deemed necessary for pesticides banned since 2013 in OECD countries.
- PMRA has not promptly cancelled the registrations of some pesticides when risks were deemed unacceptable. In one case it took 11 years to cancel the registration of a pesticide after it was determined the risks posed to human health were unacceptable.
- Lengthy phase-out periods have been allowed to occur despite the risks posed to human health of continued use.

Clearly, we cannot afford to hide behind Health Canada's PMRA and believe our health is not at stake. Least-toxic landscaping is the norm for the majority of Canadians, and Calgarians deserve no less.

Further discussion is provided in the Prevent Cancer Now submission to the Parliamentary Committee that examined the Pest Control Products Act in 2015, Appendix 2.

SECTION 2

PESTICIDE TOXICITY AS IT RELATES TO HUMAN HEALTH AND THE ENVIRONMENT

The second area that Parks expressed interest in receiving expert opinion and rationale was pesticide toxicity as it relates to human health and the environment. The very young, our future, are most vulnerable to harms from pesticides. Indeed, adverse exposures early in life can change the course of development, with life-long ramifications. Food and water may be sources of pesticides for the young, but studies of exposures from dust reveal that applications in the neighbourhood – not necessarily by the parents – can result in the highest dose for the very young who are crawling, mouthing objects and sucking their fingers.⁸

Human health

As no data was provided in the email solicitation of December 7, 2016 a website search was undertaken to locate annual reports from either Calgary Parks or Environment and Safety Management. In the past these annual reports included statistics on yearly herbicide use; however, after an extensive search, several calls to 311 and finally a call to the City Clerk's office it was discovered that these types of reports have not been done since 2013. Subsequently three requests were made to Parks requesting pesticide data from the initiation of the City's IPMP in 1998 to 2015, including a list active ingredients and amounts used, intensity of use, and mixtures of herbicides and/or insecticides used along with adjuvants (chemicals added to increase toxicity to target plants or insects).

In response a list of active ingredients, in name only, from the year 2015 only, was received on December 22, 2016 and are reviewed in Table 1. This includes 4 chemicals that possibly or probably cause cancer, according to the International Agency for Research on Cancer (IARC). Eight pesticides are listed as endocrine disruptors according to The Endocrine Disruptor Exchange. Only a few of the many least-toxic herbicides and insecticides that have become the norm in Ontario (Appendix 1) are found on Calgary's pesticide list. Extensive review of each pesticide, as well as combinations, would require more time and resources than available for this consultation. Reviews by authoritative groups of Canadian researchers have found numerous adverse outcomes from exposure to pesticides that are used in landscaping.^{9,10}

Environmental Health

In our search for expertise regarding environmental impacts of pesticides, we contacted Dr. Pierre Mineau of Pierre Mineau Consulting. Dr. Mineau was formerly a Senior Researcher Scientist with the Science and Technology Branch of Environment Canada and continues as an Emeritus Scientist with Environment Canada. He has collaborated with international agencies as well as governmental and non-governmental organizations in Canada and abroad. Dr. Mineau's current

projects include pesticide impacts, indicators of agricultural sustainability, nature conservation and integrated pest management.

When asked if he could assist Healthy Calgary and PCN with pesticide toxicity as it relates to environmental health he responded,

“...to write a detailed and cogent analysis of that large list of pesticides is a huge undertaking. Even without the time pressure, I would be loathe to take this on, at least without a solid contract and 3-4 months of free time to do it.”

Clearly, Calgary Parks’ unpublicized consultation, effectively over a one-month period (given holidays) is going to receive limited current information.

Nevertheless, some health effects and classification information regarding the target pesticides is summarized in Table 1.

Table 1. Information regarding City of Calgary pesticides, including carcinogenicity, endocrine disruption, Ontario classification for cosmetic uses, and other information

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Turf and Selective Herbicides				
2,4-D (phenoxy)	Possible (2B) 2016	✓	Banned	Chlorophenoxy herbicides, long-time herbicides, may be contaminated with highly toxic dioxins if manufactured with poor controls, and quickly. 2,4-D and pesticide assessment was reviewed, concluding much must change to protect public health. ¹²
Mecoprop	Possible (2B) 2016	✓	Banned	
Dicamba	Possible (2B) 2016	✓	Banned	
Clopyralid	-	Not listed on TEDX	Banned	Clopyralid persists in the environment and in compost, damaging crops. It is permitted only on rough, unfertilized, unirrigated turf on rights of way etc. It is banned for fine turf. ¹³

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Triclopyr	-	Not listed on TEDX	Banned	"This product is highly toxic to fish, aquatic plants and aquatic invertebrates and is not labelled for application to water surfaces. Keep out of wetlands, lakes, ponds, streams, rivers and wildlife habitats at the edge of bodies of water." "...for the control of undesirable woody plants and annual and perennial broadleaved weeds in pastures and rangelands, and in non-crop areas, including: rights-of-way, electrical power lines, communication lines, pipelines, roadsides and railroads, fencerows and around farm buildings, military bases, industrial, manufacturing and storage sites."
Amitrol	Not Classifiable (3) due to lack of human data. High incidences of thyroid and liver cancers in animal studies. ¹⁴	✓	Banned	"Do not use in residential areas. Residential areas are defined as sites where bystanders including children may be potentially exposed during or after spraying. This includes around homes, school, parks, playgrounds, playing fields, public buildings or any other areas where the general public including children could be exposed."

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Picloram	Not Classifiable (3) due to lack of human data, in 1991. Rodents had dose-related increases in thyroid and liver cancers and pre-neoplastic lesions, mostly in females. ¹⁵	✓	Banned	Potential dermal sensitizer (affects the immune system so may contribute to chronic diseases). Not registered for use in residential areas. Large buffers (e.g. 5 m) required from waterways and public areas. Very persistent; Maximum once per year; Don't disturb or move earth for several years; Contaminated with persistent, carcinogenic, endocrine disrupting hexachlorobenzene.

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Aminopyralid	-	Not listed in TEDX	Banned	<p>"Do not enter or allow worker entry to treated area for 12 hours following application ...</p> <p>"Apply only when the potential for drift to areas of human habitation or areas of human activity such as houses, cottages, schools and recreational areas is minimal. Take into consideration wind speed, wind direction, temperature, application equipment and sprayer settings. ...</p> <p>"Toxic to non-target terrestrial plants and to aquatic organisms ...</p> <p>"The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.</p> <p>... cannot be applied on domestic or commercial turf grass.</p> <p>Clippings or hay from vegetation which has been treated with aminopyralid should not be used for composting or mulching.</p> <p>Aminopyralid residues pass through animals unchanged and are still herbicidally active."</p>

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Non-selective Herbicide				
Glyphosate	Probable (2A) This has been highly contested by Monsanto. Recently reviewed by international scientists, glyphosate can cause non-Hodgkin's lymphoma. ¹⁶	✓	Generally banned, but glyphosate and glufosinate are Class 10, ¹⁷ permitted under health and safety exemption (e.g. for poison ivy)	Glyphosate is strongly correlated with cancer, as well as kidney disease and developmental problems. It is an antibiotic, so disrupts soil microbes necessary for breakdown of dead plant materials. Glyphosate also mobilizes minerals, including toxic elements such as lead and cadmium, making them available in the soil and water, and thus potentially increasing levels in plants.
Insecticides				
Mineral oil	-	Not listed on TEDX	Permitted	GRAS
Potassium salts of fatty acids	-	Not listed on TEDX	Permitted	GRAS
Imidacloprid	-	✓	Banned	A “bee-killing” neonicotinoid insecticide that is also highly toxic to aquatic insects. Parent compound and degradation products persist for years. Persistent, toxic, potentially carcinogenic breakdown product 2-chloropyridine not considered in PMRA (Health Canada) and other assessments.

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Azadirachtin (Neem seed extract)		Not listed on TEDX	Permitted	Neem seed extract – a mixture of compounds; Insufficient toxicity and persistence data for ECHA; Extremely toxic to aquatic organisms; Persistent and very mobile in soil and water; Untested, but complex multi-ring chemical structures as here often disrupt hormone actions and cause cancer.
Spinosad (from soil bacteria; unusual action on insect nervous system)	-	Not listed on TEDX	Banned	Highly toxic to bees, other beneficial insects in IPM programs, and aquatic organisms. Apply late evening; early morning to avoid bees. For sod webworm.
Pyrethrins	-	✓	Banned	Pyrethrins affect nerve impulse transmission along the length of the nerve, and are linked to neurological harms in many studies, particularly among the young. Pyrethrins are also endocrine disruptors, potentially contributing to cancers and other adverse effects.
Spirotetramat	-	Not listed on TEDX	Not listed	Toxic to beneficial insects. Do not apply during flowering or when flowering plants are present. Minimize spray to habitat such as hedgerows. Toxic to some non-target plants. NOT REGISTERED FOR TURF.

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, including from pesticide labels – the legally binding document approved by Health Canada, describing hazards, emergency response and directions for use.
Additional Ingredients				
Siloxylated polyether (surfactant)	-	Not listed on TEDX	Not listed	Surfactants are added to improve spreading and penetration of pesticides on pests. Surfactants do the same on human skin, and in the nose, throat and lungs when inhaled.
Surfactant mixture	-	Not listed on TEDX	Not listed	
Dried whole blood (vertebrate – e.g. deer – repellent)	-	Not listed on TEDX	Permitted	

- Search for Pesticide Labels here: <http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.ph>
- Ontario Class 11 (permitted for “cosmetic” purposes) pesticides are here: <https://www.ontario.ca/page/class-11-pesticides>

2,4-D = 2,4-dichlorophenoxy acetic acid; ECHA = European Chemicals Authority; GRAS = generally regarded as safe; TEDEx = The Endocrine Disruption Exchange

SECTION 3

MEASURES TO REDUCE TOXICITY OF PEST CONTROL

Upgrade IPMP standards, implementation, certification, training and education

An overhaul of the City's IPMP is long overdue. Healthy Calgary and PCN look forward to participating in the review of the IPMP to ensure standards and implementation are at levels of excellence.

It is interesting to note that IPM was originally devised as a step-wise approach to all aspects of pest control, including landscaping. It was proposed as an alternative to pesticide restrictions in Ontario, but since this approach had not resulted in demonstrable improvements in pesticide choices and uses in municipalities, it was rejected by the provincial government. Golf is the single sector that is committed to improving pesticide choices and intensity of uses using IPM, and Ontario courses are required to report annually online on the IPM Council of Canada website.

IPM courses and certification are offered through the University of Guelph. Once again it is interesting to learn that the original practitioners moved on to organic practices, as experience demonstrated that more risky choices were unnecessary. Of course there are a myriad of other courses and training that can be undertaken to learn the latest in soil science, plant phenology and health, the soil food web, permaculture, and climate change adaptation strategies.

Clean out the cupboard

There are several pesticides on the City's list which are outdated and not permitted in urban situations due to their toxicities and persistence in the environment. These chemicals include picloram, aminopyralid, clopyralid and amitrol. Dr. Mineau referred to picloram and amitrol as "dinosaurs" and was astounded that the City was still using such relics. Disposed of responsibly, there will be no temptation to continue their use. Doubtless review of the IPMP will identify others currently used, to join their ranks.

Adopt measures of other progressive municipalities and provinces

Calgary continues to be Canada's largest municipality without any protection from pesticide use. Seven provinces have enacted pesticide legislation to protect citizens and the environment from the toxic effects of pesticides. The Ontario *Cosmetic Pesticide Act* (2008) is the gold standard for provincial legislation. The *Act* was modelled on bylaws for the municipalities of Toronto and Peterborough; these also represent best practices for other jurisdictions which have adopted cosmetic pesticide bylaws across the country.

At the very least, we would like to see the City adopt and enforce a "white list" of least-toxic pesticides for use on green spaces in Calgary, mirroring Ontario's Class 11 (Appendix 1).

The preferred solution recommended by Healthy Calgary and PCN is a cosmetic pesticide bylaw to protect human health and the environment from toxic pesticide exposures. Voluntary adoption has never been as effective as regulation combined with education.

Resurrection of least-toxic pesticide committee

In the absence of an imminent cosmetic pesticide bylaw, Healthy Calgary would like to see the resurrection of a committee with regular meetings similar to the Pesticide sub-committee of the now disbanded Environmental Advisory Council. The pesticide sub-committee was created in 1999, after a proposed cosmetic pesticide bylaw failed to pass the Standing Policy Committee on Community and Protective Services. This would ensure that pesticide data is received on a timely basis, trends are ascertained, strategies and techniques are evaluated, standards are upheld and implementation of least toxic-methods of pest control are ongoing.

Hire knowledgeable weed inspectors

Move the focus, time, energy and toxic pesticides from non-legislated weeds to the restricted noxious weeds on the Alberta Weed List, using of course the least-toxic methods of control. Rapid detection and response by qualified and knowledgeable weed inspectors will reduce the occurrence and proliferation of regulated invasive plants before they become a problem, thereby reducing the amount of pesticides used. The last-known and sole weed inspector in Calgary retired some years ago.

Conclusion

Once again Healthy Calgary and Prevent Cancer Now commend the City of Calgary for inviting participation in the review of the City's Integrated Pest Management Plan (1998). For over 30 years concerned citizens in Calgary have been working tirelessly and diligently in efforts to reduce known human health and environmental impacts from many of the very pesticides that the City regularly uses. It is time to adopt "common sense measures" to protect the health and future of our children.

We look forward to next steps, for a healthier Calgary.

Respectfully Submitted by:

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Appendix 1. Least-toxic options permitted for “cosmetic” uses under Ontario’s Pesticides Act (<https://www.ontario.ca/page/class-11-pesticides>). Ingredients used by Calgary are in bold.

Ingredients contained in pesticide products that are biopesticides or certain lower risk pesticides. Licensed exterminators and persons who perform land exterminations in non-residential areas that use Class 11 pesticides are required to post a notice sign to provide public notice of the use of these pesticides, unless exempt from posting under Ontario Regulation 63/09.

Number	Active Ingredient Name
1	Acetic acid
2	Ammonium soaps of fatty acids
3	Ammonium soaps of higher fatty acids
4	Aureobasidium pullulans strain dsm 14940
5	Aureobasidium pullulans strain dsm 14941
6	Azadirachtin
7	Bacillus subtilis mbi 600
8	Bacillus subtilis qst 713
9	Bacillus thuringiensis kurstaki
10	Bacillus thuringiensis tenebrionis
11	Boracic acid (boric acid)
12	Borax
13	Brassica hirta white mustard seed powder
14	Capsaicin
15	Castor oil
16	Chondrostereum purpureum strain pfc2139
17	Citric acid (present as fermentation products of lactobacillus rhamnosus strain r-11, lactobacillus casei strain r215, lactococcus lactis ssp. cremoris strain m11/csl, lactococcus lactis ssp. lactis strain ll102/csl, and lactococcus lactis ssp. lactis strain ll64/csl)
18	Codling moth and leaf roller pheromone
19	Copper as elemental, present as tribasic copper sulphate
20	Copper as elemental, (from picro cupric ammonium formate and tannate complex)
21	Copper, present as copper octanoate
22	Copper as elemental, present as copper oxychloride
23	Corn gluten meal
24	Diallyl disulfide and related sulfides
25	Dried blood
26	Dried whole eggs
27	Extract of reynoutria sachalinensis
28	Fatty acid
29	Fish meal mixture
30	Fish oil mixture
31	Garlic
32	Hydrogen peroxide
33	Iron (present as fehedta)
34	Iron (ferrous or ferric) phosphate
35	Iron (ferrous or ferric) sulfate
36	Iron (ferrous or ferric) sodium
37	Kaolin
38	Lactic acid (present as fermentation products of lactobacillus rhamnosus strain r-11,

Number	Active Ingredient Name
	lactobacillus casei strain r215, lactococcus lactis ssp. cremoris strain m11/csl, lactococcus lactis ssp. lactis strain ll102/csl, and lactococcus lactis ssp. lactis strain ll64/csl)
39	Lime sulphur or calcium polysulphide
40	Liquid corn gluten
41	Meat meal mixture
42	Metarhizium anisopliae strain f-52
43	Methyl-anthranilate
44	Mono-and di-potassium salts of phosphorous acid
45	Mono-and dibasic sodium, potassium, and ammonium phosphites
46	Mineral oil (herbicidal or plant growth regulator or insecticidal or adjuvant)
47	Nuclear polyhedrosis virus of douglas fir tussock
48	Nuclear polyhedrosis virus of the gypsy moth
49	Nuclear polyhedrosis virus of red-headed pine sawfly
50	Oil of black pepper
51	Pantoea agglomerans strain c9-1
52	Pantoea agglomerans strain e325
53	Phoma macrostoma strain 94-44b
54	Piperine
55	Putrescent whole egg solid
56	Sclerotinia minor
57	Silicon dioxide -present as diatomaceous earth - salt water fossils
58	Soap (alkanolamine salts of fatty acid)
59	Soap (potassium salts of fatty acid)
60	Sodium chloride
61	Sodium alpha-olefin sulfonate
62	Streptomyces acidiscabies strain rl-110t and thaxtomin a
63	Sulphur
64	Trichoderma virens strain g-41
65	Trichoderma harzianum rifai strain krl-ag2
66	Trichoderma harzianum rifai strain t22
67	Typhula phacorrhiza strain 94671
68	Verticillium albo-atrum strain wcs850
69	Wintergreen oil

Appendix 2. Dr. Sears' recommendations to the Parliamentary Standing Committee on Health regarding the *Pest Control Products Act* (2002)

1. **The Precautionary Principle and Substitution Principle are necessary in risk management.** The *PCPA* requires a two-stage process: to assess the risk, then to manage it (e.g. by requiring gloves and a mask, or by restricting use to commercial applicators, or to agriculture). The Precautionary Principle is currently mentioned for risk assessment. Responsible risk management would include demonstrating the need for a product and its superiority in terms of health and environmental impacts, over other means to achieve the end.
2. **Public notice, involvement and access to information are necessary before an assessment is basically complete.** Interested and concerned members of the public are asked to provide comment following near-finalization of the assessment, but during a window of time when they cannot access the actual data upon which the assessment is based. Information in the Reading Room is inaccessible prior to final registration. This also means that data is not available on pesticides under temporary registrations (too many pesticides, for too long, as others have undoubtedly indicated).
3. Information availability is illogical. The minutiae of pesticides data is available only after the fact and only to someone equipped with pencil, paper and affidavit and able to visit in person at Riverside and Heron (to use old computers with unsearchable files). The leap from minutiae to the conclusions—the PMRA's actual data evaluation—is not available, not even in the Reading Room. I visited Health Canada three times to examine data on 2,4-D, and I was one of the Reading Room trial group. The reason the data evaluation is not provided is that it is not considered to be the "data" as prescribed in the *Act*. **The *PCPA* should be amended to prescribe public access to data evaluations, at the time the public is being asked for comment.** This information should properly be publicly available online, but at least available in the Reading Room. I have asked the infoserve how many individuals have visited the Reading Room, how many times; the infoserve has not yet responded.
4. Whether the Reading Room information is sufficiently available to be considered *publicly* accessible is debatable. I cited information from the Reading Room in an article for peer review, and the *Canadian Medical Association Journal* determined that data from the Reading Room was too inaccessible for peer review. **Accessibility of information in the Reading Room should be improved, to the extent that it can contribute to public science.**
5. I work in systematic review of scientific evidence, and the PMRA (indeed, much of Health Canada) does not have the mandate, expertise, infrastructure or informational support to properly, systematically review epidemiological evidence, using modern methods and according to modern standards. Doing this properly would probably be more efficient, faster and less expensive than present methods, as they can be discerned from outside. **Scientific best practices – modern systematic scientific review and reporting methods – should be required under the *PCPA*.**
6. The PMRA should, but does not, require complete environmental breakdown information, to CO₂, H₂O etc. For example, neonicotinoid breakdown is truncated at 6-chloronicotinic acid, just short of the highly problematic 2-chloropyridine. **Comprehensive environmental and metabolic fate data should be required under the *PCPA*.**
7. The PMRA does not comprehensively consider toxicity of breakdown products. This is not captured in animal toxicology, because the breakdown products are cleaned out of animals' cages; obviously, the breakdown products are present in the environment. **Comprehensive assessment of the toxicity of breakdown products should be required under the *PCPA*.**
8. Contaminants resulting from manufacturing processes such as dioxins in phenoxy herbicides, that are modifiable using process controls (e.g. slightly lowering the temperature), must be measured independently. You cannot rely on the proponent to provide contaminant/purity information that will reflect what is on the shelf (e.g. an Australian Broadcasting Corp. analysis of the herbicide 2,4-D found high dioxins just like the "bad old days," but data submitted by manufacturers to the PMRA and their Australian counterpart – analyses of selected production runs – was evidently acceptable. Dioxin analyses were inexplicitly

classified as confidential business information. **Independent analyses of off-the-shelf products should be required under the PCPA.**

9. Issuing permission to spread a toxic material in the environment essentially poses a public/environmental health hypothesis that this will not result in adverse effects. Health Canada has a moral, and should have a legal, obligation to follow up when it registers a pesticide. Determination that a pesticide poses an "acceptable risk" is inevitably based upon data with some substantial uncertainties and limited applicability to "real life." Health Canada should be required to have in place tracking of pesticide sales and use, levels of parent and breakdown products in "real life" soil, water, air, foods, wildlife and people, and comprehensive health and environmental data to allow the verification or refutation of this hypothesis that is embodied in the registration. Data should be reported by the PMRA, and should be publicly available so that epidemiologists can do their work. **Pesticide and breakdown product environmental, food and human ongoing data collection and reporting, along with outcomes (e.g. bee die-offs, birth defects etc.), should be mandatory under the PCPA, to validate or refute the PMRAs hypothesis that risk is indeed "acceptable."**

An example is how to explore emerging public health concerns related to pesticide use. One issue of particular importance to Canada is mobilization of toxic elements as a result of the chelating action of glyphosate herbicide (in the commercial product "Roundup"). Mobilization of toxic elements such as lead, cadmium, mercury and others, into water and foods, is of increasing concern because glyphosate use escalated with "roundup ready" crops, and glyphosate is now being used to kill and dry down wheat, pre-harvest. There are high levels of cadmium in some areas of the prairies, as well as fertilizer, and grains tend to hyperaccumulate cadmium even without glyphosate added to the mix. Unlike much of the world, Canada lacks standards for cadmium in foods, and our wheat cannot always meet European standards. Epidemic kidney disease (an organ greatly affected by cadmium) is affecting Sri Lanka and other areas with this mixture of exposures. Cadmium exerts a broad range of toxic effects and is very potent even at low levels. *Without data, we cannot detect potential problems before a health epidemic ensues.*

10. Genetically modified crops are in fact pesticides, or produce novel proteins to withstand high doses of pesticides. **Genetically modified crops should be examined under the PCPA.**
11. **Pre-mixed pesticide products** (e.g. phenoxy herbicide/glyphosate/glufosinate mixes to deal with the debacle of resistant weeds) **should undergo a complete assessment.** Interactions are well known in medicine and toxicology, and cannot always be predicted. The testing has to be carried out.
12. I, and others, have **strong concerns regarding access to information, and timely response to information requests, objections and requests for review.** I wait for months for responses, and some questions are never answered despite repeated requests. The PMRA took a year to respond, in a limited fashion, to an objection I filed. At the same time, information such as pdfs of reports is only available via email. It is odd to pay employees to forward documents that should rightfully be posted online.
13. **Scientific review requires information and library services.** One example of a cut to information services that directly affects the PMRA, as well as scientists and civil society organizations, is discontinuation of the Homologa subscription. This may yield a small savings but represents another in the series of disabling cuts to federal scientific information services. This makes it impossible for federal civil servants to do their job, ultimately to ensure a healthy, productive population. Safeguarding health is essential, in order to avoid the economic and social drag of disability, and costly healthcare for chronic illnesses and cancer.

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Chairman Gian-Carlo Carra and members of the Standing Policy Committee on Community and Protective Services

RE: PESTICIDE TOXICITY REPORT, CPS2017-0510, JUNE 7, 2017

Mr. Chair:

With me today I have submissions that were completed on or about Feb. 6, 2017 as part of Council's directive to Administration to include health organizations and expertise in the evaluation of pesticide toxicity with the goal of eliminating the most toxic pesticides used by the City on city lands. Despite Administration seeking approval to include submissions as part of the public record somehow they are missing and are barely referenced in Administration's report on Pesticide Toxicity.

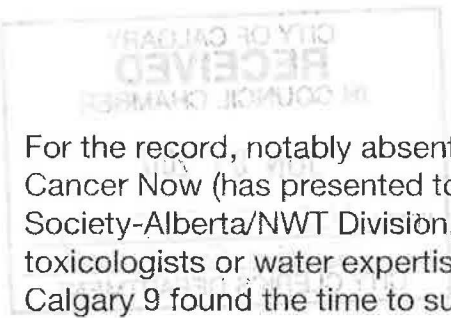
Mr. Chair, will you accept the submissions as requested by Administration to be included in the public record?

I would like to have it noted that many of the submissions you received today were completed by volunteers outside of their full-time jobs and responsibilities and are not paid lobbyists. At heart they have the health of citizens particularly children and the environment uppermost in their motivations.

As you have heard from previous presentations there is disappointment in Administration's Pesticide Toxicity Report as it was narrow in scope, contained erroneous information and failed to answer the Nov. 7, 2016 directive from Council, instead choosing to side-step the issue by stating the City of Calgary is not in the business of evaluating pesticide toxicity, that risk not toxicity should be considered and please wait until 2018Q4 for the IPM Plan Review.

I think it was CLLR Pincott's objective in his Motion at Council, Nov. 7, 2016 to assist Administration by asking Administration to include health organizations and expertise in the evaluation of pesticide toxicity for Administration's consideration.

I have to admit that the task was not easy. It is hard to evaluate pesticide toxicity when not provided with a list of pesticides used by the City or a list of organizations/expertise solicited by Administration. This resulted in a lot more work squeezed into a very short time period in order to follow up with Administration and contact organizations/expertise, research and write.



For the record, notably absent from Administration's solicitation list was Prevent Cancer Now (has presented to Council at least twice in the past), the Canadian Cancer Society-Alberta/NWT Division, The Alberta & NWT Lung Association, environmental toxicologists or water expertise. Of the 20 organizations/experts contacted by Healthy Calgary 9 found the time to submit documentation with a month's notice, essentially.

Cutting to the chase there were two expectations Healthy Calgary was hoping to hear:

1. A preliminary list of pesticides under consideration for **possible** elimination of use on City land and;
2. An exploration into designating the City's 7,600 tot lots (not 200) as synthetic, pesticide-free parks.

No doubt this is a complex issue. We were not expecting miracles in the 7 months from November 2016 to June 2017. But we were expecting a comprehensive report from Administration based on evidence with an indication of forward direction. We acknowledge the efforts Parks is undertaking with goats, community gardens, edible food initiatives, bio controls and naturalization. However this is not reflected unfortunately, in the Pesticide Toxicity Report.

With all due respect,

Robin McLeod
On behalf of the Coalition for a Healthy Calgary

Appendix 1: Considerations regarding the elimination of the most toxic pesticides used on City Land

Many other organizations have addressed pesticides, and provide solid reasons for concern. Calgary might consider, for example, no longer using:

1. Those pesticides with an **International Agency for Research on Cancer (IARC)** designation regarding human carcinogenicity (<https://www.iarc.fr>)

- 2,4-D
- Mecoprop
- Dicamba
- Glyphosate

2. And/or those pesticides on the **Endocrine Disruption (TEDX) list** (<http://endocrinedisruption.org/endocrine-disruption/tedx-list-of-potential-endocrine-disruptors/overview>)

- Amitrol
- Picloram
- Glyphosate
- Imidacloprid
- Pyrethins

3. And/or pesticide products to be de-registered by **Health Canada** (http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/_prvd2016-20/prvd2016-20-eng.php)

- Imidacloprid

4. Or the relics as described by **Dr. Pierre Mineau** (<https://www.linkedin.com/in/pierre-mineau-586b57a1/?ppe=1>)

- Aminopyralid
- Amitrol
- Clopyralid
- Picloram

5. And/or the products containing the active ingredients the City uses identified in a **lawsuit filed by Ecojustice against the PMRA** (Oct. 2012) challenging PMRA's unreasonable delay in initiating legally required special reviews. Of the 26 active ingredients (many banned in OECD countries) identified in the lawsuit, the City used products containing 6 of the active ingredients in 2014, according to former IPM lead James Burrow. <https://www.ecojustice.ca/case/pesticides-out-of-canadas-environment/#sthash.zdNPQ7xj.dpuf>

- Acephate
- Aminopyralid
- Dichobenil
- Imazapyr
- Permethrin
- Petroleum Hydrocarbon Blend

6. And/or any of the **conditionally registered pesticides by PMRA** that have exceeded the 5-year period for providing complete risk and value assessments as identified in the **Commissioner of the Environment and Sustainable Development Fall 2015 report on Pesticide Safety**. http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201601_01_e_41015.html#ex2

Sunday, February 5, 2017

Dear Mr. Steven Snell,

Your letter with regards to the City of Calgary's reevaluation of its Integrated Pest Management Plan was forwarded to me by Robin Mcleod with the Coalition for a Healthy Calgary.

I am writing to you on behalf of Parents for Pesticide-Free Schools, a new group of parents and stakeholders who are very concerned about the use of potentially cancer-causing pesticides for cosmetic purposes on school grounds and public property. Our group came together last fall, following an application of pesticides on the school grounds of the two public schools located in Nanton, Alberta.

The City of Calgary's course of action with regards to reevaluating pesticide use will become a role model for other municipalities and school boards to follow.

Under the current provincial legislation, children in Alberta are coming into direct contact with lingering pesticide residue on the ground, grass, playground equipment and air, not just through the skin, but also through ingesting grass, dandelions and sometimes dirt.

In Nanton, children were allowed back onto the school yard just mere hours following the pesticide application on the school grounds. The nauseating stench that resulted from the applied pesticides on the school grounds in Nanton, lingered on for well over a week. One mother reported a noticeable rash on her children after having played on the teeter totters. The area surrounding the teeter totters was sprayed for dandelions, which as you know, are not listed as "Prohibited Noxious" under the Alberta Weed Act.



Sunday, February 5, 2017

In a conversation with an Environmental Protection Officer of Alberta Environment and Parks, it came to light that the levels of resulting pesticide residues are not being monitored. Although there was some routine monitoring being done in the past, this practice ended five years ago due to funding cuts. The Officer further revealed that if testing for pesticide residues were to be done, even months following a pesticide application, that "we would get a positive". A transcript of this conversation is attached to this letter.

According to the American Academy of Pediatrics, "there is a growing body of literature that suggests that pesticides may induce chronic health complications in children, including neurodevelopment or behavioral problems, birth defects, asthma, and cancer." An Information Brief published by the Canadian Cancer Society in 2013 states that "children are particularly vulnerable to the dangers of pesticides because of their rapidly growing bodies and developing immune systems. Children are also at greater risk of exposure to pesticides as they are more likely than adults to spend time on the ground, crawling and playing on grass where pesticides have been used directly or on floors where residues may persist. Pesticides are easily tracked indoors where they can exist for years; inside, in the absence of soil microbes and sunlight, the rate at which pesticides breakdown slows considerably. A study of a common active ingredient in herbicides found that house dust can contribute up to 30% of a child's total exposure before application to lawns and up to 76% of exposure, post-application." Source: <https://www.cancer.ca/~media/cancer.ca/AB/get%20involved/take%20action/CosmeticPesticides-InformationBrief-AB.pdf?la=en>

As parents and the public are becoming more aware of the potential dangers of pesticides, their use by municipalities and school boards also becomes a question of liability. Are governing bodies willing to assume the potential risk associated with the deliberate exposure to pesticide residues? Parents and guardians are being asked by school boards to sign a multitude of consent forms for "Acknowledgement of Risk" for their children participating in off-site activities. Who currently assumes the risks associated with exposure to pesticides in the school yard or on public property?

A growing number of cities, municipalities and provinces are moving towards a ban on the cosmetic use of pesticides. Closest to home perhaps is the City of Saskatoon, where "herbicides have not been used since 2004 to control broadleaf weeds, such as dandelions, on park turf and sports fields." To answer your question 'What measures could be employed to reduce the use of the "more toxic" pesticides?', it would perhaps be most efficient to consult with other municipalities and cities, such as the City of Saskatoon.

Here is a link to their website: <https://www.saskatoon.ca/services-residents/housing-property/yard-garden/be-pesticide-free>

There are many innovative alternatives to using pesticides, if we only change our mindset. As an example, have you ever heard of using light technology for controlling weeds? NatureZap projects light onto the unwanted weed and into the ground for the root system. For more information, visit <http://g-neighbor.com/how-it-works/> or www.naturezap.com

As your neighbor south of the City, I am very excited about Calgary's willingness to rethink the use of pesticides within the framework of its Integrated Pest

Sunday, February 5, 2017

Management Plan. The fact that you already have five pesticide-free parks is a great start. Keep up the good work!

Please feel free to contact me if you have any further questions.

Sincerely,

Claudia Froome

On behalf of

Parents for Pesticide-Free Schools

A Grassroots Initiative

(403) 646-3288

<https://www.facebook.com/groups/223658944715319/>

Executive Assistant - Ward 5

From: Joel Beatson [joel.beatson@landscape-alberta.com]
Sent: Tuesday, June 06, 2017 12:17 PM
To: Communications Liaison – Ward 9; Office of the Mayor; cclward4@calgary.ca; cclward13@calgary.ca; cclward5@calgary.ca; cclward6@calgary.ca; cclward3@calgary.ca; cclward8@calgary.ca
Subject: Protecting Calgary's green spaces - Response to Community Services report (RESEND)

Councillor Carra and Committee members,

I'm writing today on behalf of the members of Landscape Alberta, the professional trade association for the green industry in the province. Unfortunately, we are unable to be present tomorrow, and many of our members that may have attended are in the middle of the busiest time of year.

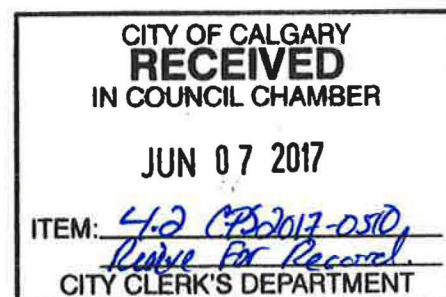
I would like to express our support for the well research and written Community Services report on Pesticide Toxicity. It does a good job explaining the fundamental science revolving around the issue (Risk = toxicity x exposure) while offering a pragmatic view of the current situation and ways to improve. We do find that the estimate used for citizen applied herbicides on turf to difficult to accurately ascertain. While licensed applicators are obligated to report usage, homeowners or unlicensed operators are not. The products used by homeowners also tend to be the least toxic options and come in ready to use formats which reduces the risk. The existing Integrated Pest Management (IPM) strategy for the City is quite good, but we would agree that there is always room for improvement.

Landscape Alberta would gladly work with City staff to update to industry standards. Last year, the first ever Canadian Landscape Standard was released (<http://www.csla-aapc.ca/standard>) which creates the single authoritative resource for landscape projects across Canada. Protecting City investments in living green infrastructure through proper construction and appropriate maintenance is something we can all get behind. Living green infrastructure is so interesting in that it increases in value over time and that value comes not only in the beauty it brings to our urban environments but in the positive impacts it has on issues of climate change. It helps mitigate storm water events, reduces the urban heat island effect, and creates healthier, cleaner environments for our communities.

Thank you for your continued support of Calgary's green spaces and we look forward to providing on-going support in your efforts to green Calgary.

Best regards,

Joel



Joel Beatson, CAE, CLM

CEO, Landscape Alberta

Phone: 780-489-1991 ext. 101 | Toll Free: 1-800-378-3198 | Cell: 587-986-8466

On Twitter: @landscapeab

We've moved! New address is 18051 107 Ave NW, Edmonton, AB T5S 1K3.

Green Industry Show & Conference – November 16 & 17, 2017 in Calgary

Executive Assistant - Ward 5

From: Brian Gibson [BGibson@greendrop.com]
Sent: Tuesday, June 06, 2017 10:24 AM
To: Executive Assistant - Ward 5
Subject: Community and Protective Services Committee Meeting

Councillor Jones,

Unfortunately, I will be in Winnipeg tomorrow and unable to attend the committee meeting with Community and Protective Services. I see you are on the committee, and wanted to forward you my thoughts on the report. As you know, I am in the green industry and have been the Chair of landscape AB for the past 2 years. Our green spaces are overrun with weeds. Our parks and sports fields are terrible. I agree with the report – the City of Calgary needs to update its' IPM program. This allows the use of herbicides (approved by Health Canada) and promotes proper cultural practices. We say we are a world class city, but do not look like it. Well maintained green spaces offer many benefits...they are good for our environment.

Thanks,

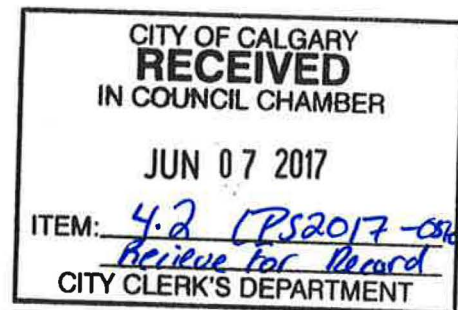
Brian

Brian Gibson / GreenKeeper

Vice President

T. 403 207 7511 C. 403 899 0634

F. 403 235 2299 E. bgibson@greendrop.com





Medical Officer of Health
10301 Southport Lane SW
Calgary, AB T2W 1S7

Telephone: 403-943-0209
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February 2, 2017

Mr. Steven Snell, MRes*, MCIP**, RPP**
Conservation Policy Team Lead
The City of Calgary
Floor 7, Calgary Public Building: 205 - 8th Ave SE
P.O. Box 2100, Station M #54, Calgary, AB Canada T2P 2M5
T 403.268.3527 | M 403.850.2091 | calgary.ca
*Master of Research in urban design
**Professional planner



Dear Mr. Snell,

Thank you for the opportunity to provide comment on the City of Calgary's current use of pesticides and input into revision of Calgary's Integrated Pest Management Plan. We support the goal of minimizing negative potential impacts to human health and the ecological determinants of health associated with pest management in Calgary, and the City of Calgary's educational and regulatory efforts to achieve this goal.

Alberta Health Services supports the use of Integrated Pest Management (IPM) as a multi-disciplinary approach to prevention and management of pest-associated impacts on the community, using principles and practices that present the least short- and long-term human health risks, have low impacts on non-target organisms, are most specific to the target species, and present the least amount of environmental risk during handling, application and disposal. The IPM framework provides a viable solution to reducing exposure to pesticides and is also the preferred method described in the Healthy Lawn Strategy (PMRA, 2009) from Health Canada.

Health Canada's Pest Management Regulatory Agency (PMRA), the responsible agency for pesticide assessment and registration in Canada, has carried out scientific evaluations of all pesticides in Canada before they become available on the market. As such, in situations where pesticide use is considered essential, PMRA-approved products should always be used in accordance with label directions. This will ensure minimal direct risks to human health, as PMRA risk assessments include consideration of the most sensitive populations, such as children. The human health and environmental impacts of alternative products are less well known.

Sincerely,

A handwritten signature in black ink, appearing to read "Jason Cabaj".

Jason Cabaj, MD, MSc, FRCPC
Medical Officer of Health
Calgary Zone



Mr. Steven Snell
The City of Calgary
Floor 7, Calgary Public Building: 205 - 8th Ave SE
P.O. Box 2100, Station M #54,
Calgary, AB Canada T2P 2M5

Dear Mr. Snell:

Thank you for the opportunity to comment on the revision of the City of Calgary, Integrated Pest Management Plan.

Invasive weeds and pests pose a significant threat; outcompeting, hybridizing or negatively affecting our native and domesticated plants and animals. Invasive weeds and pests are a form of "biological pollution" affecting ecosystem function, bank stability, and in some cases, leading to increased fire hazard.

The Association of Alberta Agricultural Fieldmen (AAAF) through the Agricultural Service Boards and the Provincial Government, have been mandated to carry out a number of Provincial Acts including the *Agricultural Pests Act*, *Weed Control Act* and *Soil Conservation Act*. The AAAF has a long history of weed and pest prevention and control. Protecting our natural environment, urban forests, productive agricultural lands and sensitive areas is a shared value and responsibility of our membership.

Our members and Agricultural Service Boards support an integrated approach to Weed and Pest Control within our municipalities. These municipalities have brush control, weed control, and mowing programs that work in unison that results in the control or eradication of noxious and prohibited noxious weeds within their boundaries. Municipalities use biological, cultural, mechanical and manual means as control measures. These programs also take into account public safety from visibility issues incurred by weeds and brush, poisonous plants, soil conservation with invasive plants taking over natural vegetation, and the aesthetic value of weed/vegetation management. Many of the municipalities have aquatic invasive control programs for such weeds as Flowering Rush that threaten water courses and lakes within the province. Municipalities are often the frontline in preventing invasive weeds and pests. All municipalities, rural and urban, have an important role and duty under the *Agricultural Pest Act* and *Weed Control Act*. The sooner the control or eradication takes place, the less environmental risk or cost and personal/public health risk is involved. Environmental risk and destruction by invasive or more aggressive plants resulting in the loss of natural habitat and

native plants can affect ecosystems significantly. Tourism can also be affected with the loss of natural habitat.

Although many weeds may be seen as cosmetic they also pose a threat to the cost of crop production. Dandelion, for example, is becoming one of the most costly, necessitating a pre-seed treatment in hay and cropland in many parts of the province.

When considering which "tools" we need to implement control measures as required by the *Weed Control Act*, we consider a number of options. If we are looking at a spectrum of weeds that need to be controlled with a selective herbicide, we need to be able to access the product that will ensure an acceptable level of control. We need that product to be efficient, reliable, accessible, cost effective, and within our equipment's capabilities. We therefore require access to the best management tools available. In the case of pest control products, we trust the products which are registered and approved for use by the Pest Management Regulatory Agency (PMRA), a branch of Health Canada.

Health Canada employs over 350 scientists, including biologists, chemists, toxicologists, epidemiologists, plant pathologists, weed scientists and entomologists, whose sole purpose is to evaluate pesticides. PMRA requires that all pesticides be subjected to a thorough scientific review and safety assessment to ensure they meet Health Canada's standards. Only those products that meet these strict health and environmental standards can be registered by the PMRA for use or sale in Canada. This rigorous assessment of products ensures that these products are safe for the applicator, bystanders and the environment when used according to the label.

The AAAP with approximately 160 members, all licenced certified applicators (through Lakeland College in Alberta) in at least one category but not limited to, Industrial, Agricultural, and Landscaping, undergo continued/updated education on a yearly basis. AAAP members as licenced certified applicators are trained in the legislative requirements for pest control and regulation of pesticides in Alberta. We are well aware of the perception of these products by some organizations. We trust Health Canada toxicologists to register effective and safe herbicides which we can use to protect the environment from invasive plants.

Herbicide application is just one of the tools available to protect our environment and is used in combination with other non-chemical methods in an Integrated Management Plan of any municipality. Proper handling, application, label directions and re-entry intervals ensures the risk to humans and other species is low or non-existent. Public education is an integral part of an Integrated Pest Management Plan and helps ensure all tools are available for use. Having the right tool for the job, and doing it correctly the first time can make all the difference. We would be happy to assist with points or concerns not addressed in this letter.

Regards,



Trent Keller
AAAP President
Athabasca County



200, 10331 - 178 Street, Edmonton, Alberta, Canada T5S 1R5

admin@landscape-alberta.com www.landscape-alberta.com www.greenindustryshow.com

February 1, 2017

Steven Snell, MRes*, MCIP**, RPP**
Conservation Policy Team Lead
The City of Calgary
Floor 7, Calgary Public Building: 205 - 8th Ave SE
P.O. Box 2100, Station M #54, Calgary, AB Canada T2P 2M5

Dear Steven,

Thank you for your request regarding the City of Calgary's evaluation of the Integrated Pest Management Plan (1998). We are pleased that you are re-evaluating this policy and happily offer our assistance wherever possible throughout the process.

In direct response to your request. The evaluation of the toxicity and public safety of pest control products in Canada there is none better in the world than the Pest Management Regulatory Agency (PMRA) through Health Canada. The PMRA is a world leader in ensuring public health in regards to existing and new products. As an industry, we trust the health of our employees and customers to the proper use and safety as stipulated by the PMRA. Combined with Alberta's own legislation regarding pesticide application licensure we have a strong regulatory framework to have a safe product being applied by trained and educated professionals. The City of Calgary should resist trends to change policy based on opinion or cherry picking of facts and instead focus on the proven science.

Integrated Pest Management (IPM) is a key driver in industry and forms the foundation of our own policy and training. Pesticides are part of the available methods but are used when the situation best warrants their use. The best option is and always has been good horticultural practice. Healthy plants are the least susceptible to pest and diseases. If you are looking to reduce pesticide usage in the City of Calgary the best advice is to increase investment in the maintenance of the existing and improve standards on new installations.

Many municipalities have strong IPM policies in place we would recommend a literature review to evaluate strategies and costs associated. As a general observation, those municipalities who have adopted IPM and have subsequently restricted (full or partial) use of pesticides have not

adequately forecasted the additional costs to care for green infrastructure. The newly available Canadian Landscape Standards are a great resource for municipalities looking to upgrade their horticultural standards of practice.

We are aware that there is growing public concern. It is our counsel that public education is crucial and should be long considered before any restrictions to services or products. The living green infrastructure of the City of Calgary is an important investment that needs to be protected accordingly. One must only look to your own ReTree YYZ program to see the value of public education regarding greening our cities.

Landscape Alberta supports the responsible use of pesticide products as part of a larger IPM program. As the industry association for professionals in the province we believe in creating healthy green spaces for the citizens of Alberta and enhancing the lives of all the live, work and play in our cities. We will happily work with the City of Calgary to support the process that best strikes the balance between public concern and the enhanced public health that comes from properly cared for living green infrastructure.

Best regards,

A handwritten signature in black ink that reads "Joel Beatson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Joel Beatson, CLM, CAE
CEO, Landscape Alberta

cc:

Councilor Ward Sutherland
Councilor Joe Magliocca
Councilor Jim Stevenson
Councilor Sean Chu
Councilor Richard Pootmans
Councilor Ray Jones
Councilor Andre Chabot
Councilor Shane Keating
Councilor Peter Demong



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Mr. Steven Snell
The City of Calgary
Floor 7, Calgary Public Building: 205 - 8th Ave SE
P.O. Box 2100, Station M #54,
Calgary, AB Canada T2P 2M5

Dear Mr. Snell,

Thank you for providing Rocky View County with the opportunity to comment on the revision of the City of Calgary's Integrated Pest Management Plan.

The *Alberta Weed Control Act* states that all landowners are responsible for keeping weeds under control. The act also applies to municipalities such as the City of Calgary and Rocky View County. Invasive weeds designated as noxious and prohibited noxious under the *Alberta Weed Control Act* spread rapidly and can out-compete native species. This negatively impacts natural environments by decreasing native plant diversity.

Rocky View County shares a border with the City of Calgary (the City) on the west, north and east side of the City and invasive weeds are easily transmitted across our borders. Rocky View County takes invasive weed control very seriously and utilizes an integrated approach in the control and elimination of legislated invasive species. As part of our integrated weed management program we elect to use herbicides in conjunction with biological and mechanical control options. The Health Canada Pest Management Regulatory Agency (PMRA) monitors, evaluates and regulates all herbicides within Canada to ensure they pose minimal risk to human health and the environment when used according to the label directions.

While the County appreciates the use of integrated control measures, Rocky View County's Agricultural Services Section has concerns with the potential elimination of registered herbicides for use on City-owned lands. Several perennial weed species that are currently listed on the Act are extremely difficult to control and the use of a PMRA registered product may be the most appropriate means to control or eliminate the weed infestation. Barring the use of certain herbicides may lead to the further spread of invasive weed populations and this poses a severe threat to agricultural producers and other Rocky View County residents.

Agricultural Services works cooperatively with the City of Calgary on the Calgary and Area Governmental Weed Committee and values the work that the committee sets out to accomplish. The cooperation of the municipalities involved has been instrumental in the control of invasive weeds within the region.

Regards,

A handwritten signature in blue ink, appearing to read 'Jeff Fleischer'.

Jeff Fleischer
Supervisor, Agricultural Fieldman
Agricultural Services, Rocky View County

February 9, 2017

Steven Snell, MRes*, MCIP**, RPP**
Conservation Policy Team Lead
The City of Calgary
Floor 7,
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Calgary, AB
T2P 2M5

RE: City of Calgary Consultation on Pesticides - Pesticide toxicity/Integrated Pest Management review

On behalf of Canada's plant science industry, CropLife Canada appreciates the opportunity to provide the City of Calgary with our written submission.

Who We Are

CropLife Canada is the trade association representing the manufacturers, developers and distributors of plant science innovations — pest control products and plant biotechnology — for use in agriculture, urban, and public health settings. Our members represent approximately 98 per cent of the pest control product market in Canada. These companies have significant business interests in Alberta, including Calgary, and provide valuable tools that are a critical part of the value chain for Alberta's agricultural, industrial vegetation and other sectors.

CropLife Canada and our members support a strong, science-based regulatory system for all pesticides.

CropLife Canada strongly recommends that the City of Calgary maintain a regulatory approach to pesticides that is harmonized with the federal regulator.

How Pest Control Products Are Regulated in Canada

Pesticides are one of the most stringently regulated products in Canada. PMRA employs over 300 scientists, including biologists, chemists, toxicologists, epidemiologists, plant pathologists, weed scientists and entomologists, for the sole purpose of evaluating pesticides. Before a pesticide can be approved for use in Canada, PMRA requires that it undergo a thorough scientific review and safety assessment to ensure it meets Health Canada's standards. Only those products that meet the strict health and environmental standards can be registered by PMRA for use or sale in Canada.

The federal *Pest Control Products Act* (PCPA) mandates that all registered pest control products are subject to periodic reevaluation by PMRA to ensure that their regulatory decisions are always made on the basis of the best and most current available science. PMRA has recently completed re-evaluations of eight of the most widely used lawn and garden products and, where necessary, mandated changes to the permitted use patterns in order to minimize any potential risk to the user, bystanders, or the environment.

Introducing the concept of “perception” with respect to pesticide use and practices would well leave the impression that the scientific rigor required by the PMRA is open to interpretation. Furthermore, it implies that one is able to categorize pesticides based on an arbitrary ranking. Each registered pest control product is approved for specific uses on specific pests, and when used as directed, does not pose a risk to the environment or human health.

Impact of Additional Restrictions

If the City of Calgary were to apply a non-science based approach and use “perception”, for example, as a means to rank pesticides for use on City-owned land, the City would face escalating costs for weed control as well as the logistical challenge of somehow managing to control invasive weeds that are destroying green space and damaging infrastructure. This impact has been well documented in Manitoba.¹

Additionally, citizens would not only be left with the mistaken and false impression that products they rely on to protect their own lawns and gardens are unsafe but that approved non-conventional products are lower risk than their conventional counterparts which is not necessarily the case. In other jurisdictions where nonscientific restrictions have been imposed, we have also seen an increase in the use of homemade pesticides that have never been subject to a toxicological risk assessment and which may pose significant risks to human and environmental health, as recently highlighted by Health Canada.²

The Ontario Experience

The Province of Ontario has had a ban on the sale of Health Canada-approved pesticides for domestic use since 2009, a ban that also applies to use by Ontario municipal governments. The result has been damaged public infrastructure, rampant spread of invasive weeds, parks and playing fields rendered virtually unusable, vast tracts of grass destroyed by insects, and a loss of urban green space as homeowners and municipalities give up on trying to maintain them.

¹ <http://www.cbc.ca/news/canada/manitoba/manitoba-pesticide-ban-needs-review-municipalities-say-1.3607665>

² <http://healthycanadians.gc.ca/health-sante/environnement-environnement/pesticides/homemade-maison-eng.php>

There is also growing evidence of frustration and defiance amongst Ontario homeowners relating to the urban pesticide ban in that province. In a survey of 1000 urban Ontario homeowners in 2014, (see attached) the Blacksheep Strategy Group found:

- 71% of respondents were seeing more weeds on their lawn, while 47% were reporting more insect infestations on their lawns;
- 50% were less satisfied with the state of public green spaces in their community;
- 47% are unsatisfied with the products available to them since the ban, while only 20% expressed satisfaction with their current choices;
- 50% of respondents say that they are now applying fertilizer more frequently, while 46% have re-sodded all or parts of their lawn. (Using sod from farms that are exempt from the Ontario ban.);
- 31% have converted all or some of their lawn or green space into patios, decking, rock gardens, etc., further accelerating the loss of urban green space;
- 25% have developed their own mixture to kill weeds (in spite of Health Canada's warnings on this subject), while 25% also report cancelling a lawn or maintenance service due to dissatisfaction with the results.

Moving Forward

Canada's plant science industry is science-based, innovation-focused, and strongly supportive of our world-leading federal regulatory process here in Canada. Based on our experience with this issue we would strongly recommend the city not introduce perception as a factor in this decision making process. For example, citizens may have the perception that taxes are too high or that the city uses too much, or not enough, salt on the streets during winter storms. We submit that perception is not a robust substitute for evidence-based decision making.

Unscientific restrictions and ranking of pesticides stigmatizes all uses of pesticides, and creates additional unnecessary costs for local governments and school boards, businesses and homeowners. As Ontario experienced, these restrictions will result in more homeowners exploring homemade pesticide options which actually increases the risk to the very audience the law claims to help.

As stated previously, CropLife Canada strongly recommends that the City of Calgary maintain a regulatory approach to domestic class pesticides that is harmonized with the federal regulator. Furthermore, we recommend that City of Calgary officials work closely with PMRA, an agency that has decades of experience in this field and a worldwide reputation for excellence in safeguarding public health.

We also support a public education campaign, in collaboration with municipalities, provinces and the federal government, educating consumers on the proper use of household

chemicals, including pesticides. As an industry, we welcome the opportunity to work with you to develop, and distribute, appropriate messaging.

We are committed to providing safe and effective products that protect the value of private and public green spaces. We advocate for the proper use of our products and we believe in the rigorous science-based processes that exist to ensure their safe use.

We look forward to the opportunity to discuss our concerns and work with the City of Calgary to develop a path forward that not only recognizes and respects the importance of science-based decision making but also ensures the City of Calgary and its citizens are able to protect green spaces and infrastructure throughout your jurisdiction.

If you have any questions regarding our submission please contact me.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Pierre Petelle".

Pierre Petelle
Acting President and CEO
CropLife Canada



Dow AgroSciences

Dow AgroSciences Canada Inc.
Suite 2400, 215 - 2 Street SW, Calgary, AB T2P 1M4

dowagro.ca

February 6, 2017

Steven Snell
Conservation Policy Team Lead
The City of Calgary
Floor 7, Calgary Public Building: 205 - 8th Ave SE
P.O. Box 2100, Station M #54
Calgary, AB Canada T2P 2M5
T: 403.268.3527; M: 403.850.2091

Dear Mr. Snell:

SUBJECT: CITY OF CALGARY CONSULTATION ON PESTICIDES
Comments Provided by Dow AgroSciences Canada Inc.

Dow AgroSciences Canada Inc. (DAS) appreciates the opportunity to provide the City of Calgary with comments for the stakeholder consultation on pesticide use within the City.

We trust that this letter will address the areas of concern raised by the City of Calgary in the December 7, 2016 email from S. Snell to stakeholders. In particular, we hope to address questions related to human health and safety of pest control products approved for use in Canada.

Background – Who is Dow AgroSciences (DAS)?

DAS is a Canadian pest control product registrant company headquartered in Calgary, with commercial and research operations across Canada. We currently hold over 260 pest control product registrations in Canada consisting of agricultural, range and pasture, and industrial vegetation management (IVM) products. We are a member of CropLife Canada (CLC), the trade association representing the manufacturers, developers and distributors of plant science innovations – pest control products and plant biotechnology – for use in agriculture, urban and public health settings.

DAS is also a member of Responsible Care®, a chemistry industry association. Responsible Care® companies innovate for safe products and processes, and work to continuously improve their environmental, health and safety performance. Responsible Care® covers all aspects of a company's business, over the entire life cycle of its products. It requires companies to engage



with plant-site neighbours, communities along transportation corridors, emergency responders, critics, and governments at all levels, to advance laws and regulations supporting sustainability¹.

DAS supports a strong, science-based regulatory system for pest control products. As such, we support the scientific, risk assessment based approach of the Pest Management Regulatory Agency (PMRA), a branch of Health Canada which regulates pest control products in Canada. As a member of the plant science industry in Canada, we believe in securing legislation, regulation and policy that ensure product safety, and encourage industry innovation and sound science.

Regulation of Pest Control Products in Canada

Federal oversight of pest control products is through the Pest Management Regulatory Agency (PMRA), a branch of Health Canada with the mandate to ensure protection of human health and the environment.

Pesticides are one of the most stringently regulated products in Canada. The PMRA employs over 350 scientists, including biologists, chemists, toxicologists, epidemiologists, plant pathologists, weed scientists and entomologists, for the sole purpose of evaluating pesticides. Before a pesticide can be approved for use in Canada, PMRA requires that it undergo a thorough scientific review and safety assessment to ensure it meets Health Canada's standards. Only those products that meet these strict health and environmental standards can be registered by the PMRA for sale or use in Canada.

As outlined by PMRA in their Annual Report for 2015-2016², Health Canada uses a science-based risk assessment and risk management process to regulate pesticides in Canada, both before and after they are registered for use:

"Before a pesticide can be sold in Canada, pesticide registrants are required to provide PMRA with large volumes of data to show that their product does not pose unacceptable risks to health and the environment, and that the product has value. These data are reviewed by PMRA scientists to determine whether a product is acceptable for registration in Canada.

PMRA's science-based risk assessment includes the following:

- an examination of all sources and routes (oral, dermal, inhalation) of potential exposure to a given pesticide, including exposure through diet, from drinking water and from contact with treated areas like lawns and gardens;
- an estimation of the amount of pesticides that people, including children, may come in contact with, both during and after a pesticide application;

¹ Canadian Responsible Care Website, http://www.canadianchemistry.ca/responsible_care/index.php/en/index

² Pest Management Regulatory Agency Annual Report 2015-2016.
http://publications.gc.ca/collections/collection_2017/sc-hc/H110-2016-eng.pdf



- a human health risk assessment with a particular focus on vulnerable populations, including children; this considers the potential for a pesticide to cause adverse health effects such as cancer, birth defects and endocrine disruption, and allows registration only for those pesticides with exposures well below levels that cause adverse effects;
- an assessment of the movement, persistence and transformation (fate) of a pesticide in the environment;
- an environmental risk assessment that considers risks to plants, birds, mammals, beneficial insects, aquatic organisms as well as fate in the environment; and,
- a value assessment that considers the contribution of the product to pest management, as well as its health, safety and environmental benefits, and social and economic impact.”

PMRA also employs a rigorous process for the risk management of older pest control products through their re-evaluation and special review programs, their compliance and enforcement activities, and also their responses to health and environmental incidents. This post-market regulation of pesticides, mandated by the federal *Pest Control Products Act* (PCPA), involves the PMRA review of currently registered pesticides on a 15-year cyclical review process through their internationally recognized “Re-evaluation Program” (PMRA, 2016³). That is, PMRA ensures that every active ingredient is re-evaluated at least every 15 years. Through this program, PMRA ensures that registered pest control products meet modern standards for health and environmental protection, and that they have value to society. PMRA ensures that the most modern, up-to-date methodologies, data, and scientific approaches are utilized in their re-evaluation risk assessments. If pest control products do not pass PMRA’s risk assessments, they are discontinued or mitigation measures are required, such as label and use restrictions.

Special reviews are another process in addition to re-evaluation that PMRA uses to determine the continued acceptability of registered pest control products, where the review is focussed on addressing a specific concern (for example, concerns raised by an Organisation of Economic Cooperation and Development (OECD) member country decision to prohibit all uses of an active ingredient).

In addition to the stringent federal regulation of pesticides, Alberta has provincial responsibilities and manages regulations under the Provincial *Environmental Protection and Enhancement Act* (E.P.E.A.), which controls the sale, use, application, handling, storage, transport and disposal of pesticides in Alberta⁴. The E.P.E.A. contains the following regulations specific to pesticides:

- *Pesticide (Ministerial) Regulation*;
- *Pesticide Sales, Handling, Use and Application Regulation*;
- *Environmental Code of Practice for Pesticides*.

³ PMRA Re-Evaluation Program. <http://www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/regist-homolog/reval/index-eng.php>

⁴ Information on Alberta’s Provincial Pesticide Regulations. <http://aep.alberta.ca/lands-forests/land-industrial/programs-and-services/pesticide-management/pesticide-regulation.aspx>



These Provincial regulations provide additional safeguards on the use of pest control products in Alberta.

Human Health and Environmental Safety of Pest Control Products

It is important to note that all Domestic class products have been specifically assessed by PMRA for use by homeowners and are considered safe when used according to label directions. Additionally, Commercial class products have been assessed by PMRA for use by farmers, growers, ranchers, and trained certified pesticide applicators and are also considered safe when used according to label directions. In fact, all currently registered pesticide products are considered safe when used according to label directions. PMRA will not register a product if it poses an unacceptable risk to humans, animals or the environment, as outlined in a number of their mission statements to the public, including the following:

“Our role is to determine if proposed pesticides can be used safely when label directions are followed and will be effective for their intended use. If there is reasonable certainty from scientific evaluation that no harm to human health, future generations or the environment will result from exposure to or use of a pesticide, its registration for use in Canada will be approved.”⁵

“Health Canada will not register a pesticide that is known to cause cancer or other illnesses when used according to label directions.”⁶

As mentioned previously, the *PCP Act* mandates that all registered pest control products are subject to periodic re-evaluation by Health Canada to ensure that their regulatory information is up-to-date with the most current science. PMRA's review incorporates data generated by the registrant, published literature and the assessments of other regulatory agencies. As part of Health Canada's commitment to transparency, stakeholders are engaged through the public consultation process before a registration decision is made. To this end, PMRA has recently completed re-evaluations of eight of the most widely used lawn and garden products and where necessary, mandated changes to the permitted use patterns in order to minimize any potential risk to the user, bystanders, or the environment.

For example several thousand studies have been conducted on 2,4-D, the most widely used lawn care herbicide, throughout its 67 year history. These studies were reviewed by the PMRA during several extensive re-evaluations. They concluded that risks to homeowners and their children from contact with 2,4-D treated lawns and turf are not of concern.⁷

PMRA also recently concluded their re-evaluation of glyphosate and concluded, “*An evaluation of available scientific information found that products containing glyphosate do not present unacceptable risks to human health or the environment when used according to the proposed label directions.*”⁸

⁵ <http://www.hc-sc.gc.ca/cps-spc/pest/part/index-eng.php>

⁶ <http://www.hc-sc.gc.ca/cps-spc/pest/faq-eng.php>

⁷ <http://www.hc-sc.gc.ca/cps-spc/pubs/pest/decisions/rev2013-02/index-eng.php>

⁸ <http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/prvd2015-01/prvd2015-01-eng.php>



Benefits of Pest Control Products

There are three main types of pest control products or pesticides: **herbicides**, **fungicides** and **insecticides**. All pesticides serve a purpose and provide value to the end-user, whether they are a farmer, home-owner or industrial vegetation manager.

Herbicides kill unwanted plants (weeds) so crops and turf can flourish. Weeds and other invasive plants are often the most damaging pests for many agricultural crops and turf grass areas because they compete for vital nutrients, space, water and sunlight. In urban settings, herbicides help control weeds that could otherwise destroy lawns, gardens, parks and sports fields. They also play an important safety role in industrial settings — for example, by keeping telephone and power lines free from damaging weed growth.

Fungicides are pesticides that protect plants from disease-causing organisms like the one that caused the infamous Irish potato famine of the 1800s. In people's home gardens, roses, tomatoes and peppers are particularly susceptible to fungi. On a farm, a fungus can spread quickly from one plant to destroy an entire field.

Insecticides control insects that could damage crops by eating them or infecting them with diseases. Fighting these pests is difficult in part because of the sheer variety of insects and in part because new invasive species are continually being introduced as a result of globalization. Insecticides treat insects like lawn-devouring grubs, tree-smothering caterpillars, maggots that tunnel through fruit crops and larvae that can devastate grain crops.

There are many different kinds of pest control products to serve many purposes. Three of the main uses are agricultural, urban and industrial.

Agricultural pesticides make up the majority of pesticides in Canada⁹. Farmers use these products to protect their crops against loss from insects, weeds and disease. Without them, pests severely reduce the amount of food, fuel or fibre farmers are able to produce.

Urban pesticides protect public and private green spaces from insects, weeds and diseases. They come in consumer formulations diluted for use at people's homes as well as commercial-grade products designed for use by people with specialized training, like those at lawn care and landscaping companies.

Industrial pesticides are used for industrial vegetation management — for instance, by highway maintenance crews to improve visibility or by oil and gas crews to prevent fires. Without industrial pesticides, our highways, railways and power lines would be overtaken by weeds, causing lower visibility, more power outages and increased risk of fires.

Invasive Weed Control and the Alberta Weed Control Act

A plant is considered "invasive" when it is not native to the specific geographical location where it is growing and when it has a tendency to spread to an extent that may damage the environment, human economy or human health. Many invasive plants by their very nature spread rapidly, creating monocultures that choke out native plant species and reduce plant

⁹ Pest Control Products Sales Report for 2014. <http://www.hc-sc.gc.ca/cps-spc/pubs/pest/corp-plan/sales-ventes/index-eng.php>

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diversity. Invasive species can be present in rural areas or within cities, affecting native flora and fauna, and disturbing the natural ecosystem. They can also affect agriculture productivity and yield, and have the potential to damage infrastructure. Some invasive species even pose a direct toxicity threat to humans and animals. An example is tall buttercup, an invasive, noxious weed in Alberta that contains a bitter, irritating oil called protoanemonin that is toxic to livestock and other grazing animals, including horses, cows and goats.^{10,11}

Invasive plants need to be managed to maintain the natural balance of plants in an ecosystem. In areas where humans have disturbed the natural ecosystem through necessary construction of roads, utility rights-of-way, or railways, intervention with herbicides is sometimes required to maintain balance in the plant ecosystem, and manage the types of plants growing in that area for safety reasons. Invasive plant species can also hybridize with native plant species, impact soil and water resources, and promote other invading species.

The Alberta Weed Control Act and Regulations mandate the control of noxious, prohibited noxious and weed seeds "through various control measures, such as inspection and enforcement, together with provisions for recovery of expenses in cases of non-compliance".¹² There are numerous weeds listed in the Weed Control Act that are required, by law, to be controlled by landowners. The Act applies throughout all municipalities, including the City of Calgary.

There are a variety of options in the vegetation manager's "tool box" to manage invasive weeds. Herbicides are one of several methods used to manage invasive plants, weeds, shrubs and trees in vegetation management programs. Each site and management program is unique, and so each requires an individualized approach. Vegetation management programs should generally be proactive and integrated, and rely on several control strategies to help reach their goals. Control options include mechanical (such as trimming, cutting, mowing and hand picking); chemical (herbicide application); and biological methods.

The different control options have varying effects on the environment and on the plants being controlled. For long term planning, the use of herbicides has been demonstrated to be very effective in controlling and managing invasive weeds. Herbicides have been proven to be the least expensive and most effective weed control method, when compared to other mechanical method such as mowing. The use of chemical vs. mechanical weed control can actually reduce CO₂ emissions, as less fossil fuels are consumed.

Herbicides used to control noxious and invasive weeds or encroaching woody vegetation can benefit pollinators by suppressing the undesired plants that displace the valuable native plants which provide them with food or shelter. For example, Hopwood et al. (2015) stated that

¹⁰ Tall Buttercup Fact-sheet, AB Invasive Species Council. <https://www.abinvasives.ca/factsheets/140610-fs-tallbuttercup.pdf?iframe=true&width=800&height=600>

¹¹ Tall Butter Cup Information, AB Agric. [http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/prm13929](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/prm13929)

¹² Alberta Weed Control Act and Regulations. [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/acts6156](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6156)



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"Roadsides with abundant wildflowers, especially native plants, managed by judicious mowing, herbicides, and other management tools, provide the best pollinator habitat."¹³

Other Benefits of Herbicides for Vegetation Control

Public Safety Around Roadsides and Railways

Vegetation along roadsides, if unmanaged, can obstruct driver vision at intersections, block sight lines around curves, and make traffic signs difficult to see. The same safety concerns apply to railroads. Heavy equipment moves at high speeds along the rails, and unchecked weeds and brush can reduce train traction during starts and stops. Weeds in the track ballast can hold water around railroad ties, causing them to rot and increasing the chance of derailments. In dry conditions, plants growing close to the tracks create a fire hazard, and may be ignited by sparks from the rails. Brush that obstructs motorists' view at railroad crossings is especially dangerous. Controlling it can help prevent accidents.

Power Supply Security

It's important that schools, hospitals, businesses and homeowners are able to trust the utility companies that serve their interests to prevent power outages. Utility vegetation managers are critical in preventing service interruptions and being ready to restore power quickly if outages occur. Trees and brush growing into power lines can cause electrical power outages and make utility line or pipeline maintenance difficult and dangerous. Areas around utility substations require a vegetation-free zone to prevent fire hazards and ensure the transfer of electricity. Keeping utility lines and pipelines clear of overgrown vegetation ensures they can be maintained easily to provide a reliable power supply to customers, and can help ensure quick accessibility in the event of a pipeline break or spill. The second largest blackout in history occurred in Eastern Canada and the North Eastern United States in 2003, triggered by unmanaged trees growing into power lines, causing a domino effect of power shut down. An estimated 10 million people in Canada and 45 million people in the US were without power for days in the middle of winter.

Industrial Worker and Public Safety

At oil and gas, power and hydro facilities, keeping the ground bare is a matter of safety. Unmanaged vegetation can create operational, safety and fire hazards. Mowing and hand pulling are used to support bare ground, but herbicide application provides more effective and longer lasting results, reducing the hazard and the frequency of onsite maintenance.

Invasive Weed Control Promotes Biodiversity

Invasive plants need to be managed to maintain the natural balance of plants in an ecosystem. In areas where humans have disturbed the natural ecosystem through necessary construction of roads, utility rights-of-way, or railways, intervention with herbicides is sometimes required to maintain balance in the plant ecosystem, and manage the types of plants growing in that area for safety reasons.

More information about invasive species and the efforts made to control their spread through one of Canada's invasive species councils:

¹³ J. Hopwood, S. Black, and S. Fleur. 2015. Roadside Best Management Practices that Benefit Pollinators. https://www.environment.fhwa.dot.gov/ecosystems/Pollinators_Roadsides/BMPs_pollinators_landscapes.pdf



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- Canadian Council of Invasive Species; canadainvasives.ca
- Alberta Invasive Species Council; abinvasives.ca

Protect Investment in Ornamental Plants

The City of Calgary and community associations spend a considerable amount of resources planting ornamental plants and trees. These plants are also very susceptible to pests. The use of herbicides, insecticides and fungicides is important to properly maintaining and protecting them.

Summary and Next Steps

We ask that the City of Calgary leverage the existing federal and provincial regulation of pesticides to guide their decisions at the municipal level.

To this end, DAS supports the PMRA position that all products which are reviewed and approved by PMRA, are safe for use as long as they are used according to label directions. Therefore, any comparison of relative toxicity of PMRA-registered products is not warranted and should not be pursued by the City of Calgary. It is not appropriate for the City to try and categorize currently registered pest control products into different toxicity classes. This approach, while well-meaning, has the potential to undermine PMRA's science-based review process. "Low risk" or "lower risk" are phrases that are not used by federal regulators. Rather, PMRA speaks of "acceptable risk" a more nuanced but much more accurate phrase. As noted previously, ***all pest control products*** that are registered by the PMRA for use are deemed to pose an acceptable risk when used according to label instructions.

The City of Calgary should also be cautious in any exploration of alternatives to conventional pest control products. The promotion of so-called "natural" products is not without its own risks, as homemade pesticides have never been subject to a toxicological risk assessment and may pose significant risks to human and environmental health, as recently highlighted by Health Canada¹⁴.

DAS fully supports the principles of integrated pest management (IPM) which considers pesticides as only one of several pest management tools available. The benefits of pesticide use are numerous and they should be taken into account when designing any Integrated Pest Management Plan. Alberta Agriculture defines IPM as "using a combination of control methods (cultural, biological, chemical and mechanical) in a program that is both economically and environmentally sound"¹⁵. IPM programs make use of all appropriate pest management strategies, including the judicious use of pesticides. IPM is not a single pest control method but rather involves integrating multiple control methods based on site information obtained through inspection, monitoring and reports¹⁶. We ask the City of Calgary to rely on PMRA's rigorous, science-based regulation of pesticides in guiding the use of pesticides as part of the City's Integrated Pest Management Plan.

¹⁴ <https://www.canada.ca/en/health-canada/services/about-pesticides/homemade-pesticides.html>

¹⁵ [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex9350](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex9350)

¹⁶ <https://www.epa.gov/managing-pests-schools/introduction-integrated-pest-management#Principles>



Our industry is science-based, innovation-focused, and strongly supportive of our world-leading federal regulatory process here in Canada. As such, we are concerned by any approach by municipal governments to pursue any unscientific categorization or restrictions of pesticides that would contradict the federal approval process. This approach has the potential to stigmatize all uses of pesticides and can create additional unnecessary costs for local governments and school boards, businesses and homeowners.

Pesticide regulatory agencies around the world, including the US EPA and PMRA, use risk-based rather than hazard-based assessments. A risk assessment takes into account potential exposure to the product. DAS recommends that the City of Calgary maintain a regulatory approach that is harmonized with our federal regulator, Health Canada. This would be a strong and welcome vote of confidence in science- and risk-based regulation. Furthermore, we recommend that the City of Calgary officials work closely with PMRA, an agency that has decades of experience in this field and a worldwide reputation for excellence in safeguarding public health.

We also support a public education campaign, in collaboration with the federal and provincial governments, educating consumers on the proper use of household chemicals, including pesticides. As an industry, we welcome the opportunity to work with you to develop, and distribute, appropriate messaging.

We are committed to providing safe and effective products that protect the value of private and public green spaces. We advocate for the proper use of our products and we believe in the rigorous science-based processes that exist to ensure their safe use.

If the City of Calgary would like further technical information on specific DAS products, please contact DAS and we would be pleased to provide the information requested.

DAS looks forward to working with the City of Calgary to further discuss any questions that you may have and also to help develop a workable path forward.

For any further information, do not hesitate to contact me directly by phone at (403) 735-8866 or by email at cwgrekul@dow.com.

Sincerely,

A handwritten signature in black ink that reads "Chad Grekul".

Chad Grekul
Regulatory & Environmental Affairs Manager

January 10, 2017

Office of the Mayor
The City of Calgary
P.O. Box 2100
Station M
Calgary, AB, T2P 2M5

COPY

Dear Mayor Nenshi and Calgary City Council:

The College and Association of Registered Nurses of Alberta (CARNA) is the regulatory college and professional association for Alberta's 37,000 registered nurses and nurse practitioners. CARNA considers the motion passed by the City of Calgary to evaluate pesticide toxicity as part of the Integrated Pesticide Management Plan review to be an important step towards eliminating the more toxic pesticides from use on city land. It is a significant opportunity to substitute least harmful alternatives for the toxic chemicals currently being used.

A large body of research evidence has indicated that any benefits of pesticides come with significant health risks. There are many epidemiological and toxicological studies linking a range of health problems to pesticide exposure including various cancers, birth defects, reproductive damage, neurological and developmental toxicity, endocrine disruption, learning disabilities and asthma. Chemical pesticides are designed to interfere in biological processes so it is not surprising that they have side effects on exposed human populations as well as the environment, especially on those most vulnerable – children, pregnant women and nursing mothers.

Children tend to get greater exposure whenever pesticides are released because they are more likely play on the ground and be in direct contact with grass where pesticides have been used. Their developing organs and tissues are more vulnerable to harm. Children are even exposed to pesticides in utero, when crucial physiological development occurs. They also have a long time ahead of them to develop health problems from early pesticide exposures and from cumulative effects of these and other exposures.

For all of these reasons, the precautionary approach would indicate that pesticides should not be used in order to prevent potential health effects. Precaution is all the more important because detection of pesticide damage in individuals is difficult and it may take years for the effects of pesticide damage to become apparent.

Expert caring makes a difference®

CARNA encourages the City of Calgary to be a leader within Alberta on this important issue by committing to use of only the safest of pesticides and, to the greatest extent possible, incorporating other turf management methods to manage city green spaces.

Best regards,

A handwritten signature in black ink, appearing to read 'G. Macdonald', with a stylized flourish at the end.

Gerald ("Jerry") Macdonald, BScN, RN, CCN(C)
President

cc:

Steven Snell
Conservation Policy Team Lead
The City of Calgary

Robin McLeod
President, Coalition for a Healthy Calgary
www.healthycalgary.ca

From: [MJ DeCoteau](#)
To: [Snell, Steven](#)
Cc: ramcleod@telusplanet.net
Subject: Re: Pesticide toxicity/Integrated Pest Management
Date: Monday, February 06, 2017 8:51:37 AM
Attachments: [6296DB28-D500-422D-833E-BF96CCD7F7BD.png](#)
[70C65193-55DE-46A5-A2B3-0218782E334C.png](#)
[F3428F4F-AF75-4466-A57B-03899612654A.png](#)
[B69D19BF-926F-4E96-8182-24E59F68ED18.png](#)
[38297D63-688C-468B-AF65-F45D123835A5.png](#)
Importance: High

Hi Steven,

Apologies for the delay in responding. The email that was forwarded to me below is the first I've heard of your work on pesticide toxicity. I think your original email was missed or didn't go through?

Rethink Breast Cancer applauds your goal of eliminating the use of the more toxic pesticides on City-owned land. The widespread use of synthetic (man-made) chemicals in modern life has dramatically changed the chemical makeup of the environments inside and outside of our bodies. Some pollutants can directly damage our genes, while others can mimic estrogen or disrupt the normal hormonal balance and lead to abnormal breast cell growth. The impact of these chemicals on breast health however has only been partly studied, and is highly contested. Even if the absolute risk of chemicals on breast health has not been established, many environmental epidemiologists are in favour of moving toward the precautionary principle – reducing people's exposure to environmental pollutants even if there is uncertainty about the risks. **Rethink Breast Cancer recommends young women exercise caution around chemicals rather than wait for definitive proof.**

Rethink is a member of the Union for International Cancer Control. UICC unites the cancer community through our members and partners to reduce the global cancer burden and drive forward a global united agenda that is working to integrate effective cancer control into existing health services and development plans. This year's, World Cancer Day theme (organized by UICC) this past Saturday was "We Can I Can" and two of the many calls to action were "We Can Create Healthy Cities" and "We Can Create Healthy Workplaces". Canada has an opportunity, and arguably an obligation, to play a leadership role in advancing both of these. Workplaces should put in place policies to prevent occupational exposure to cancer-causing agents, such as asbestos and other workplace carcinogens. See more at <http://www.worldcancerday.org/materials>

Best,

MJ

MJ DECOTEAU

Founder + Executive Director



570 - 215 Spadina Avenue | Toronto, ON | M5T 2C7

T 416.920.0980 x.222 | **F** 416.920.5798

rethinkbreastcancer.com



From: Maura Young <maura@rethinkbreastcancer.com>
Date: Friday, February 3, 2017 at 12:57 PM
To: Mary Jo DeCoteau <mj@rethinkbreastcancer.com>
Subject: FW: Pesticide toxicity/Integrated Pest Management

Hi

I don't remember seeing another email about this, I think sometimes they go to spam.

From: ramcleod [<mailto:ramcleod@telusplanet.net>]
Sent: February-03-17 12:27 PM
To: Rethink Breast Cancer
Subject: Fwd: Pesticide toxicity/Integrated Pest Management
Importance: High

Hello MJ Couteau:

I haven't heard from you but am sending along Steven Snell's reminder of the Feb. 6th deadline for submission regarding pesticide toxicity and the review of the City of Calgary's IPM plan. An extension is possible if you talk to Steven. Please let me know if plan to submit.

Thank you.

Yours truly,

Robin McLeod
Coalition for a Healthy Calgary - pesticide-free@yyc
403-703-0018

From: "steven snell" <Steven.Snell@calgary.ca>
To: "steven snell" <Steven.Snell@calgary.ca>
Cc: "chris manderson" <Chris.Manderson@calgary.ca>, "dave hayman" <Dave.Hayman@calgary.ca>, "angie arrau" <Angie.Arrau@calgary.ca>, "christy caswell" <Christy.Caswell@calgary.ca>, "joe groat" <Joe.Groat@calgary.ca>, "Julie, Lincoln" <Lincoln.Julie@calgary.ca>

Sent: Thursday, February 2, 2017 4:30:08 PM
Subject: Pesticide toxicity/Integrated Pest Management

Greetings,

You received an email from me or via your professional network regarding The City of Calgary's work on pesticide toxicity and pest management. I'm following up with a friendly reminder.

We'd like any responses you have on that email (below) by the end of the day Monday, February 6. If you'd like to provide a response but can't make that deadline, please let me know and we'll try to make arrangements to include your feedback in whatever way we can. I'm also available to talk over the phone about your viewpoint on these topics if that's easier for you; my phone number is in my signature block.

Thank-you to those of you who've submitted a position; your input and any further feedback received will be very helpful as we begin the work to update our Integrated Pest Management Plan.

Regards,

Steven.

--

Greetings,

As you may be aware, City of Calgary Council has directed Administration to evaluate pesticide toxicity with the goal of eliminating the use of the more toxic pesticides on City-owned land. In conjunction with this work, Calgary Parks has begun a revision to its Integrated Pest Management Plan (1998).

As part of the program, we are seeking consultation with public health professionals / researchers / organizations to determine the current perceptions and practices of pesticides as a tool to control legislated weeds and pests, protect City assets and ensuring human health and safety in Calgary.

The City is interested in capturing expert opinion on pesticide toxicity and use through the lens of environmental and human health impacts. We have identified you as a contact for an organization or as a researcher who may have informed insight on pesticide toxicity/use in an urban environment. We are interested in receiving your expert position and rationale on,

- The current perceptions and practices of pesticides as a tool to control legislated weeds and pests, protect City assets and ensuring human health and safety in an urban environment;
- Pesticide toxicity, as it relates to environmental and human health; and/or
- What measures could be employed to reduce the use of the "more toxic" pesticides.

We invite you to submit your current position to us to inform the baseline engagement with

subject matter experts. Your feedback will both inform Calgary Council on the “current state” of perceptions and practices involving pesticide toxicity/use and be used as expert input into the revision of Calgary’s Integrated Pest Management Plan. We are seeking your feedback for **end of day, February 6, 2017.**

Feel free to distribute this email within your professional network; however, please let me know which contact/group you are distributing the email to, so that I can track expert stakeholders for future engagement.

Best regards,

Steven.

Steven Snell, MRes*, MCIP**, RPP**
Conservation Policy Team Lead
The City of Calgary
Floor 7, Calgary Public Building: 205 - 8th Ave SE
P.O. Box 2100, Station M #54, Calgary, AB Canada T2P 2M5
T 403.268.3527 | M 403.850.2091 | calgary.ca
*Master of Research in urban design
**Professional planner

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Sunday, February 5, 2017

Dear Mr. Steven Snell,

Your letter with regards to the City of Calgary's reevaluation of its Integrated Pest Management Plan was forwarded to me by Robin Mcleod with the Coalition for a Healthy Calgary.

I am writing to you on behalf of Parents for Pesticide-Free Schools, a new group of parents and stakeholders who are very concerned about the use of potentially cancer-causing pesticides for cosmetic purposes on school grounds and public property. Our group came together last fall, following an application of pesticides on the school grounds of the two public schools located in Nanton, Alberta.

The City of Calgary's course of action with regards to reevaluating pesticide use will become a role model for other municipalities and school boards to follow.

Under the current provincial legislation, children in Alberta are coming into direct contact with lingering pesticide residue on the ground, grass, playground equipment and air, not just through the skin, but also through ingesting grass, dandelions and sometimes dirt.

In Nanton, children were allowed back onto the school yard just mere hours following the pesticide application on the school grounds. The nauseating stench that resulted from the applied pesticides on the school grounds in Nanton, lingered on for well over a week. One mother reported a noticeable rash on her children after having played on the teeter totters. The area surrounding the teeter totters was sprayed for dandelions, which as you know, are not listed as "Prohibited Noxious" under the Alberta Weed Control Act.

In a conversation with an Environmental Protection Officer of Alberta Environment and Parks, it came to light that the levels of resulting pesticide residues are not being monitored. Although there was some routine monitoring being done in the past, this practice ended five years ago due to funding cuts. The Officer further revealed that if testing for pesticide residues were to be done, even months following a pesticide application, that "we would get a positive". A transcript of this conversation is attached to this letter.

According to the American Academy of Pediatrics, "there is a growing body of literature that suggests that pesticides may induce chronic health complications in children, including neurodevelopment or behavioral problems, birth defects, asthma, and cancer." An Information Brief published by the Canadian Cancer Society in 2013 states that "children are particularly vulnerable to the dangers of pesticides because of their rapidly growing bodies and developing immune systems. Children are also at greater risk of exposure to pesticides as they are more likely than adults to spend time on the ground, crawling and playing on grass where pesticides have been used directly or on floors where residues may persist. Pesticides are easily tracked indoors where they can exist for years; inside, in the absence of soil microbes and sunlight, the rate at which pesticides breakdown slows considerably. A study of a common active ingredient in herbicides found that house dust can contribute up to 30% of a child's total exposure before application to lawns and up to 76% of exposure, post-application." Source: <https://www.cancer.ca/~media/cancer.ca/AB/get%20involved/take%20action/CosmeticPesticides-InformationBrief-AB.pdf?la=en>

Sunday, February 5, 2017

As parents and the public are becoming more aware of the potential dangers of pesticides, their use by municipalities and school boards also becomes a question of liability. Are governing bodies willing to assume the potential risk associated with the deliberate exposure to pesticide residues? Parents and guardians are being asked by school boards to sign a multitude of consent forms for "Acknowledgement of Risk" for their children participating in off-site activities. Who currently assumes the risks associated with exposure to pesticides in the school yard or on public property?

A growing number of cities, municipalities and provinces are moving towards a ban on the cosmetic use of pesticides. Closest to home perhaps is the City of Saskatoon, where "herbicides have not been used since 2004 to control broadleaf weeds, such as dandelions, on park turf and sports fields." To answer your question 'What measures could be employed to reduce the use of the "more toxic" pesticides?', it would perhaps be most efficient to consult with other municipalities and cities, such as the City of Saskatoon.

Here is a link to their website: <https://www.saskatoon.ca/services-residents/housing-property/yard-garden/be-pesticide-free>

There are many innovative alternatives to using pesticides, if we only change our mindset. As an example, have you ever heard of using light technology for controlling weeds? NatureZap projects light onto the unwanted weed and into the ground for the root system. For more information, visit <http://g-neighbor.com/how-it-works/> or www.naturezap.com

As your neighbor south of the City, I am very excited about Calgary's willingness to rethink the use of pesticides within the framework of its Integrated Pest

Management Plan. The fact that you already have five pesticide-free parks is a great start. Keep up the good work!

Please feel free to contact me if you have any further questions.

Sincerely,

Claudia Froome

On behalf of

Parents for Pesticide-Free Schools

A Grassroots Initiative

(403) 646-3288

<https://www.facebook.com/groups/223658944715319/>



**EVALUATION OF INTEGRATED PEST MANAGEMENT IN CALGARY
PESTICIDE TOXICITY, IMPACTS ON HUMAN HEALTH
AND THE ENVIRONMENT, AND BEST PRACTICES**

Submitted by:

**COALITION FOR A HEALTHY CALGARY
AND
PREVENT CANCER NOW**

**TO
THE CITY OF CALGARY**

FEBRUARY 10, 2017

Attention:

Steven Snell Steven.Snell@calgary.ca
Chris Manderson chris.manderson@calgary.ca
Dave Hayman dave.hayman@calgary.ca>
Angie Arrau angie.arrau@calgary.ca>
Christy Caswell christy.caswell@calgary.ca>
Joe Groat joe.groat@calgary.ca>
Lincoln Julie lincoln.julie@calgary.ca>

This submission was prepared in response to an email solicitation to the *Coalition for a Healthy Calgary* dated December 7, 2016.

About Us

The *Coalition for a Healthy Calgary* (Healthy Calgary) is a registered, nonprofit society incorporated under the Societies Act of Alberta. It was formed in April 2007 in response to concerns regarding the use of pesticides, particularly in areas where children play. A coalition of citizens, health care professionals, scientists, landscaping and horticultural professionals and health and environmental organizations, Healthy Calgary continues the work of two previous organizations, Lawns for Kids and Pesticide Free Yards of the Sierra Club, that were active through the 1980s to the early years of 2000.

Prevent Cancer Now (PCN) is a national civil society organization, incorporated in 2007. It is broad-based, including scientists and medical professionals, labour, educational representatives, as well as concerned citizens from all walks of life, working to eliminate contributors to cancer (and other chronic conditions). PCN Chair, Meg Sears PhD, has twice addressed Calgary councillors to discuss pesticides and least-toxic options for landscaping, and is grateful to Healthy Calgary for notice of this consultation.

INTRODUCTION

Healthy Calgary and PCN welcome the opportunity provided by Councillor Pincott's motion in Council to direct Administration to include health organizations and expertise in the review of the City of Calgary's Integrated Pest Management Plan (IPMP). This is the first review of the plan since adoption in 1998, and we look forward to active participation in the review.

Healthy Calgary and PCN prepared this joint submission to City of Calgary, Parks. Both of our organizations share a common goal – to see adopted “common sense measures” whereby only the least-toxic pest control strategies are used on public and private green spaces in Calgary, while pesticides not identified as least-toxic can be used only if alternative methods have been exhausted and their application is deemed necessary to address an imminent threat to public health.

Pesticides are devised and used specifically to disrupt biological processes, so achieving pest control using least-toxic options in highly populated environments is “low hanging fruit” to protect public health. Thus, we commend Calgary Council for considering human and ecological health in the current review of Integrated Pest Management (IPM) on City Lands, and welcome the opportunity to contribute our perspectives.

In this joint submission Healthy Calgary offers the local and historical context of the mission to adopt least-toxic measures to manage landscapes in Calgary. PCN brings a depth of experience and scientific expertise on the evaluation of pesticide toxicity and human health impacts.

Two limitations of this submission are that the City of Calgary's pesticide use has not been reported and only limited information was provided; and that full review of health and environmental impacts of these chemicals (and probable but undisclosed combinations) would be

a more lengthy endeavor than is possible here.

Thus this joint submission is to provide the City of Calgary, as requested in the solicitation of December 7, 2017, an expert opinion and rationale (while acknowledging the above caveats) regarding:

1. The current perceptions and practices of pesticides as a tool to control legislated weeds and pests, to protect City assets and to ensure human health and safety in an urban environment;
2. Pesticide toxicity, as it relates to human and environmental health; and
3. Measures that can be employed to shift to least-toxic pest control options.

SECTION 1

CURRENT PERCEPTIONS AND PRACTICES OF PESTICIDES AS A TOOL TO CONTROL LEGISLATED WEEDS AND PESTS, TO PROTECT CITY ASSETS AND TO ENSURE HUMAN HEALTH AND SAFETY IN AN URBAN ENVIRONMENT

Pesticides as a tool to control legislated weeds and pests to protect city assets and human health and safety – perceptions and practices

In 1998 the City of Calgary adopted Integrated Pest Management (IPM) as a program of practice to manage and protect City assets from pests. IPM requires quantitative monitoring of pests, with various strategies to achieve targets. Horticultural practices (informed by soil testing) are used to optimize growing conditions for desired species, while conditions are made less favourable for undesired species. Careful records are maintained to identify more and less successful strategies, and to track progress year to year. More toxic pesticides are used only when necessary to protect public health (Ontario permits glyphosate or glufosinate only to protect public health, for example from poison ivy).

Low standard of integrated pest management application and implementation

Without reports on targeted, relevant pests, it is difficult to gauge the City's use of pesticides to control legislated weeds and pests while ensuring human health and safety. Lack of response to repeated information requests as to how much of which pesticides have been sprayed when and where, suggests that key data collection and analysis is lacking. The only complete data set received, many years ago, was for 2005. Calls to 311 and to the City's IPM leads, formerly James Borrow, and currently Lincoln Julie, have gone unheeded.

Making pesticide data available to the public is a basic feature of an excellent IPM program. Past history of pesticide use should be readily available upon request without resorting to a Freedom of Information Request. The only conclusions that may be drawn is that either the City records

are in disarray contrary to IPM and provincial regulations, and/or the City is reluctant to inform the citizens of Calgary, thereby denying them their right to know.

Outdated and hazardous pesticides still used

A plethora of least-toxic alternatives have been identified within Ontario's pest control product lists (Appendix 1), but Calgary continues to use many chemicals that pose extensive health and environmental hazards – these include persistent chemicals that Health Canada only permits in remote areas, away from populations (e.g. picloram, aminopyralid, clopyralid, amitrol). Without fundamental features of true IPM, it is unclear how Calgary's program meets the standard. We can only conclude that the fundamentals of IPM are not followed by the City of Calgary, given the inability of staff and contractors to make least-toxic choices for pest control.

Inappropriate responses to innocuous plants – “cosmetic” pesticide use

The question is posed regarding “legislated” weeds and pests, whereas the focus of Calgary's public opinion survey and Administration's report is on dandelions. Dandelions are not included on the Alberta Provincial Weed List as a prohibited or restricted noxious weed. It was determined that dandelions do not pose an economic, health or environmental risk, which is consistent with other Canadian jurisdictions. If dandelions are not an economic, health or environmental risk, then spraying dandelions fits the definition of *cosmetic use of pesticides*; the use of pesticides to improve the aesthetics of the landscape with no countervailing health benefit.

Claims by Administration that cosmetic and blanket spraying does not occur are countered by well-documented observations of trucks equipped with sprayers along roadways in particular, and in parks. Councillor Pincott noted the amount of roadway spraying at the Meeting of Council November 28, 2016, and was curious as to the process/steps undertaken to arrive at the use of toxic chemicals to control a non-regulated weed under the City's Integrated Pest Management Program (IPMP). Similar to Councillor Pincott, Healthy Calgary and PCN are also curious as to the occurrence of plant counts, soil testing, soil amendment applications, deeper and quality topsoil additions, over-seeding, slit seeding, aeration and watering to promote and establish more “desirable” vegetation. Spraying without horticultural follow-up amounts to simply clearing the surface for another round of germination.

Thus the perception exists that pesticides are the first line of defense in the City's IPM tool kit. The proliferation of signage beginning late spring through to October points to the City doing little more than applying herbicides to control weeds. Although this perception may be erroneous, awareness of alternative least-toxic methods of pest control has taken the form of small trials (e.g. goats) rather than instituting alternative practices as the status quo. Signage, plus the lack of information to the contrary, leaves the public to conclude the obvious – reliance on pesticide spraying.

Calgary uses herbicides banned elsewhere

It is clear to Healthy Calgary, citizens of Calgary and particularly visitors from other provinces, that the City of Calgary does *not* use pesticides to control *only* legislated weeds that pose

immediate risks to human health and the environment. The City is perceived to rely heavily on herbicides to control dandelions, despite serious concerns for health when these toxic chemicals are used in an urban environment. In fact a call to IPM revealed that the dandelion is used as a proxy for broadleaf weeds. It is not known, however, whether the proxied, broadleaf weeds require control or eradication under the Alberta Weed Control Act. The chemicals of choice are 2,4-D, mecoprop and dicamba which are banned for “cosmetic” uses for a majority of Canadians.

Dandelions are a concern of a minority of Calgarians

The City’s commissioned survey on Citizens Attitudes towards Dandelions (August 2016) revealed that only 36% of the population is concerned about dandelions. The survey indicates that that segment of the population tend to be older, retired and homeowners. The same survey found that 25% of Calgarians don’t care about dandelions and 34% of Calgarians are neutral regarding dandelions. This illustrates that Administration is responding to a small minority of the population using, more often than not, toxic chemicals to control dandelions – not legislated weeds. Although 50% of Calgarians believe that the City uses chemicals to control dandelions, when provided with a choice of techniques, 80% to 87% of respondents preferred less harmful methods such as naturalization, goats, and turf removal.

An August 2016 Alberta Pesticide Survey, by OraclePoll Research, commissioned by PCN and the Canadian Association of Physicians for the Environment, supports the above. Two-thirds of Albertans responded that pesticides used for lawns and gardens pose a threat to children’s health. A majority of Albertans, 62%, said they would support a law that phases out the use and sale of all but the safest pesticides for lawns and gardens in Alberta. The youngest residents of the Province (18-34 years) were most likely to support the proposed legislation at 70%.

Dandelions have become politicized, science dismissed

Counting complaint calls is a most unscientific method to determine the use of chemicals that may harm human health and the environment. Politicians are responding to citizen complaints and votes – not science. There is no mechanism available to record dandelion complaints, specifically, when calling 311. The Community Standards Bylaw 5M2004 refers to long grasses and herbaceous plants with no specification except for height. Administration equated 311 bylaw complaints with dandelions, with no methodology to validate this conclusion. Direct complaints to Councillors were also included in the overall numbers but not made public. On the other hand, complaints about spraying were not mentioned.

Despite informed advice from Administration that a \$1.7 million dollar extra mowing program would do little to control dandelions Council voted in favour of the program. After one extra mowing cycle the program was cancelled.

Pesticides are registered for use by Health Canada so they must be ok

Many people believe that Health Canada’s Pest Management Regulatory Agency (PMRA) is protecting the health of Canadians via the assessment and registration of pesticides. As long as directions are followed the risks associated with pesticide use are reduced to an “acceptable” level. Some directions may prove difficult to achieve (e.g. prolonged periods before re-entry of a

sprayed property, prohibition of soil disturbance for prolonged periods following use of some pesticides, and personal instructions to avoid skin contact and inhaling); however IPM practitioners, pesticide applicators and the pesticide industry are quick to assert that Canada has one of the best regulatory agencies in the world.

Unfortunately we cannot rely upon Health Canada's PMRA, as experience has identified important gaps regarding protection of public health and pesticides.

Scientific limitations of Canadian federal pesticide regulation

The Pest Management Regulatory Agency (PMRA) regulates products that destroy or control pests, under the Pest Control Products Act (PCPA).¹ A "pest" is an organism that is "harmful, noxious or troublesome."

The PMRA and the health and medical community reach opposite conclusions regarding pesticides and human health. The doctors, who urge precautionary minimization of exposures, rely upon the real-life human epidemiological research rather than the confidential industry-produced animal test data relied upon by the PMRA. The PMRA conducts virtually no testing itself. Rather, it conducts a paper audit of data submitted by the pesticide manufacturers.

Unfortunately, its assessment of human risk is flawed, for the following reasons:

1. **High dose animal testing in labs is of limited relevance for people.** Testing determines the maximum dose that does not make an animal (usually a rodent such as a rat or mouse) seriously ill. Rodents are different from humans, in that they have enzymes that help them metabolize poisons. Humans do not have the same enzymes and, of course, tests are not conducted on humans. That would be unethical.
Also, tests do not generally cover the animal's lifespan. In humans, exposures that may cause no symptoms in the mother can cause life-long harm to her unborn child, and childhood exposures can cause symptoms in adulthood. Some effects may be passed through generations due to changes in gene expression, called epigenetic effects.
2. **Tests do not address low dose or cumulative effects, as they build up with multiple exposures and over time.** In fact, the regulatory system actually dissuades companies from doing low dose, environmentally relevant testing, because any positive findings would preclude the product being registered. This highlights the need for independent research. Some health effects occur at doses commonly encountered in the environment, effects that may predispose people to cancers as well as other major chronic diseases. One important mechanism by which this happens is endocrine disruption.
3. **No testing is done on endocrine disruption – an important mechanism behind many pesticides' chronic toxicities.** Many pesticides disrupt the endocrine, or hormone systems.² Hormones orchestrate every step of development from gestation through the entire lifespan. They act at extremely low concentrations in the body, and endocrine disrupting chemicals can have different, even opposite effects at higher doses.³ Alterations to hormone levels

during critical windows of development can cause permanent changes to children's lives, affecting their intelligence and behaviour, and making them more susceptible to infections, asthma, obesity, diabetes, reproductive failure, cardiovascular disease and cancers. One 2011 study reviewed [endocrine effects of 91 pesticides](#).² A second study confirmed previously known androgen effects of some pesticides,⁴ while among [previously untested pesticides](#) nine were anti-androgenic and seven were androgenic. The [US Environmental Protection Agency](#) and the European Union are screening pesticides for effects related to actions of estrogen, androgen, thyroid and other hormones. A [2012 review](#) of 845 scientific papers showed evidence that endocrine-disrupting chemicals have adverse health impacts at very low doses in animals and humans.⁵

4. **Only active ingredients are tested.** Additives or “formulants” are used in pesticide products to slow metabolism of the active ingredient (i.e., prolong its effect), and to improve spreading and absorption of the active ingredient. Additives can do the same when pesticides contact humans. A [2014 study](#) found that 8 of 9 common commercial products tested were hundreds of times more toxic to human cells than just the pesticide active ingredient without formulants.⁶
5. **Pesticides are not tested in combination.** While we know that chemicals can act very differently in combination, only single chemicals are assessed in isolation.
6. **Pesticide registration is based on all directions being followed.** Even if people make the effort to access the label fine print, instructions are extremely difficult to follow. For example: “avoid inhaling”; “avoid contact with the skin or eyes”; and “apply only when there are no children, pregnant women, elderly persons, pets or animals present.”
7. **The PMRA does not take into account much of the medical literature.** Real-life study of the effects of pesticides is difficult, and the PMRA dismisses all of this information as showing only correlation but not the level of causation required before taking action. The PMRA is of the opinion that it is virtually impossible to *prove* that chronic pesticide exposures cause harm to humans. This leaves the federal regulator relying upon industry-supplied high dose animal testing.
8. **A perverse effect of the regulatory framework is that companies are dissuaded from testing at ecologically relevant levels.** Pesticide registration hinges upon application of several “extrapolation factors” and environmentally relevant testing may result in denial of registration.

Federal audits of Health Canada's pesticide management

The Federal Commissioner of the Environment in the 2015 audit of pest control products found glaring deficiencies and concerns regarding pesticide registration.⁷ Some concerns are as follows:

- PMRA had made little progress since the 2008 audit to limit the duration of some conditional registrations (when pesticide sales are permitted pending further information

to complete the assessment). Eight of nine products that had been registered conditionally for a decade or more were neonicotinoids, a class of neurotoxic insecticides that have been linked to Bee Colony Collapse Disorder and the death of other pollinators and aquatic species.

- Under conditional registrations the PMRA permits use of the pesticide without having received and assessed the risk and value assessments to determine the impacts on human health and the environment. At the time 80 out of 7,000 pesticide products were conditionally registered. None of industry studies are available to the public until the pesticide is fully registered, and even then an individual must personally visit offices in Ottawa and record relevant information with pen and paper.
- PMRA has never exercised its authority to cancel a conditional registration when a registrant has failed to satisfy conditions of registration, within a five-year period.
- Re-evaluations of older pesticides are behind schedule.
- Cumulative health impacts have not been addressed when required in the re-evaluations of pesticides.
- It took the filing of a lawsuit before the PMRA began to consider whether special reviews were deemed necessary for pesticides banned since 2013 in OECD countries.
- PMRA has not promptly cancelled the registrations of some pesticides when risks were deemed unacceptable. In one case it took 11 years to cancel the registration of a pesticide after it was determined the risks posed to human health were unacceptable.
- Lengthy phase-out periods have been allowed to occur despite the risks posed to human health of continued use.

Clearly, we cannot afford to hide behind Health Canada's PMRA and believe our health is not at stake. Least-toxic landscaping is the norm for the majority of Canadians, and Calgarians deserve no less.

Further discussion is provided in the Prevent Cancer Now submission to the Parliamentary Committee that examined the Pest Control Products Act in 2015, Appendix 2.

SECTION 2

PESTICIDE TOXICITY AS IT RELATES TO HUMAN HEALTH AND THE ENVIRONMENT

The second area that Parks expressed interest in receiving expert opinion and rationale was pesticide toxicity as it relates to human health and the environment. The very young, our future, are most vulnerable to harms from pesticides. Indeed, adverse exposures early in life can change the course of development, with life-long ramifications. Food and water may be sources of pesticides for the young, but studies of exposures from dust reveal that applications in the neighbourhood – not necessarily by the parents – can result in the highest dose for the very young who are crawling, mouthing objects and sucking their fingers.⁸

Human health

As no data was provided in the email solicitation of December 7, 2016 a website search was undertaken to locate annual reports from either Calgary Parks or Environment and Safety Management. In the past these annual reports included statistics on yearly herbicide use; however, after an extensive search, several calls to 311 and finally a call to the City Clerk's office it was discovered that these types of reports have not been done since 2013. Subsequently three requests were made to Parks requesting pesticide data from the initiation of the City's IPMP in 1998 to 2015, including a list active ingredients and amounts used, intensity of use, and mixtures of herbicides and/or insecticides used along with adjuvants (chemicals added to increase toxicity to target plants or insects).

In response a list of active ingredients, in name only, from the year 2015 only, was received on December 22, 2016 and are reviewed in Table 1. This includes 4 chemicals that possibly or probably cause cancer, according to the International Agency for Research on Cancer (IARC). Eight pesticides are listed as endocrine disruptors according to The Endocrine Disruptor Exchange. Only a few of the many least-toxic herbicides and insecticides that have become the norm in Ontario (Appendix 1) are found on Calgary's pesticide list. Extensive review of each pesticide, as well as combinations, would require more time and resources than available for this consultation. Reviews by authoritative groups of Canadian researchers have found numerous adverse outcomes from exposure to pesticides that are used in landscaping.^{9,10}

Environmental Health

In our search for expertise regarding environmental impacts of pesticides, we contacted Dr. Pierre Mineau of Pierre Mineau Consulting. Dr. Mineau was formerly a Senior Researcher Scientist with the Science and Technology Branch of Environment Canada and continues as an Emeritus Scientist with Environment Canada. He has collaborated with international agencies as well as governmental and non-governmental organizations in Canada and abroad. Dr. Mineau's current

projects include pesticide impacts, indicators of agricultural sustainability, nature conservation and integrated pest management.

When asked if he could assist Healthy Calgary and PCN with pesticide toxicity as it relates to environmental health he responded,

“...to write a detailed and cogent analysis of that large list of pesticides is a huge undertaking. Even without the time pressure, I would be loathe to take this on, at least without a solid contract and 3-4 months of free time to do it.”

Clearly, Calgary Parks’ unpublicized consultation, effectively over a one-month period (given holidays) is going to receive limited current information.

Nevertheless, some health effects and classification information regarding the target pesticides is summarized in Table 1.

Table 1. Information regarding City of Calgary pesticides, including carcinogenicity, endocrine disruption classification for cosmetic uses, and other information

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, include labels – the legally approved by Health hazards, emergency directions for use.
Turf and Selective Herbicides				
2,4-D (phenoxy)	Possible (2B) 2016	✓	Banned	Chlorophenoxy herbicides, may be toxic dioxins if many controls, and quickly assessment was required much must change health. ¹²
Mecoprop	Possible (2B) 2016	✓	Banned	
Dicamba	Possible (2B) 2016	✓	Banned	
Clpyralid	-	Not listed on TEDX	Banned	Clpyralid persists in in compost, damage only on rough, unfertilized on rights of way etc turf. ¹³

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, includ labels – the legally approved by Healt hazards, emergenc directions for use.
Triclopyr	-	Not listed on TEDX	Banned	“This product is high plants and aquatic i labelled for applicat Keep out of wetland streams, rivers and edge of bodies of w of undesirable wood perennial broadleav and rangelands, an including: rights-of-w lines, communicatio roadsides and railro around farm building industrial, manufact
Amitrol	Not Classifiable (3) due to lack of human data. High incidences of thyroid and liver cancers in animal studies. ¹⁴	✓	Banned	“Do not use in resid areas are defined a including children r exposed during or a includes around hor playgrounds, playin or any other areas v including children c

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, include labels – the legally approved by Health hazards, emergency directions for use.
Picloram	Not Classifiable (3) due to lack of human data, in 1991. Rodents had dose-related increases in thyroid and liver cancers and pre-neoplastic lesions, mostly in females. ¹⁵	✓	Banned	Potential dermal sensitizer; may suppress immune system so chronic diseases). Not registered for use in waterways and public areas. Very persistent; May persist for years; Contaminated with endocrine disrupting

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, include labels – the legally approved by Health hazards, emergency directions for use.
Aminopyralid	-	Not listed in TEDX	Banned	<p>“Do not enter or allow access to treated area for 12 h after application ...</p> <p>“Apply only when there are no areas of human habitation or human activity such as schools and recreation areas. Take into consideration wind direction, temperature, and spray equipment and spray pattern.</p> <p>“Toxic to non-target aquatic organisms .</p> <p>“The use of this chemical may result in contamination of ground water (in areas where soils are sandy soil) and/or the water table is shallow.</p> <p>... cannot be applied to commercial turf grass.</p> <p>Clippings or hay from treated areas have not been treated with aminopyralid and can be used for composting.</p> <p>Aminopyralid residues are stable and are not degraded by sunlight.</p>

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, include labels – the legally approved by Health Canada, emergency directions for use.
Non-selective Herbicide				
Glyphosate	Probable (2A) This has been highly contested by Monsanto. Recently reviewed by international scientists, glyphosate can cause non-Hodgkin's lymphoma. ¹⁶	✓	Generally banned, but glyphosate and glufosinate are Class 10, ¹⁷ permitted under health and safety exemption (e.g. for poison ivy)	Glyphosate is strongly suspected of causing cancer, as well as kidney and developmental problems. It also disrupts soil microorganisms and the breakdown of dead organic matter. Glyphosate also mobilizes toxic elements including cadmium, making them available for uptake by plants and water, and thus increasing their levels in plants.
Insecticides				
Mineral oil	-	Not listed on TEDX	Permitted	GRAS
Potassium salts of fatty acids	-	Not listed on TEDX	Permitted	GRAS
Imidacloprid	-	✓	Banned	A "bee-killing" neonicotinoid is also highly toxic to bees and other beneficial insects. It is a persistent compound and degrades slowly for years. Persistent carcinogenic breakdown products include chloropyridine not controlled by Health Canada and

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, include labels – the legally approved by Health hazards, emergency directions for use.
Azadirachtin (Neem seed extract)		Not listed on TEDX	Permitted	Neem seed extract compounds; Insufficient persistence data for Extremely toxic to a Persistent and very Untested, but complex structures as here c actions and cause c
Spinosad (from soil bacteria; unusual action on insect nervous system)	-	Not listed on TEDX	Banned	Highly toxic to bees in IPM programs, ar Apply late evening; bees. For sod webv
Pyrethrins	-	✓	Banned	Pyrethrins affect ne along the length of 1 to neurological harm particularly among t also endocrine disru contributing to canc effects.
Spirotetramat	-	Not listed on TEDX	Not listed	Toxic to beneficial i during flowering or v are present. Minimiz as hedgerows. Toxi plants. NOT REGIS

Pesticide	IARC designation re. human carcinogenicity	Endocrine Disruption (TEDX) endocrinedisruption.org	Ontario Classification – Class 11 (permitted) ¹¹ or Class 9 (banned)	Comments, includ labels – the legally approved by Health hazards, emergency directions for use.
Additional Ingredients				
Siloxylated polyether (surfactant)	-	Not listed on TEDX	Not listed	Surfactants are add and penetration of p Surfactants do the s and in the nose, thro inhaled.
Surfactant mixture	-	Not listed on TEDX	Not listed	
Dried whole blood (vertebrate – e.g. deer – repellent)	-	Not listed on TEDX	Permitted	

- Search for Pesticide Labels here: <http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.ph>
- Ontario Class 11 (permitted for “cosmetic” purposes) pesticides are here: <https://www.ontario.ca/pesticides>

2,4-D = 2,4-dichlorophenoxy acetic acid; ECHA = European Chemicals Authority; GRAS = generally regarded as safe
The Endocrine Disruption Exchange

SECTION 3

MEASURES TO REDUCE TOXICITY OF PEST CONTROL

Upgrade IPMP standards, implementation, certification, training and education

An overhaul of the City's IPMP is long overdue. Healthy Calgary and PCN look forward to participating in the review of the IPMP to ensure standards and implementation are at levels of excellence.

It is interesting to note that IPM was originally devised as a step-wise approach to all aspects of pest control, including landscaping. It was proposed as an alternative to pesticide restrictions in Ontario, but since this approach had not resulted in demonstrable improvements in pesticide choices and uses in municipalities, it was rejected by the provincial government. Golf is the single sector that is committed to improving pesticide choices and intensity of uses using IPM, and Ontario courses are required to report annually online on the IPM Council of Canada website.

IPM courses and certification are offered through the University of Guelph. Once again it is interesting to learn that the original practitioners moved on to organic practices, as experience demonstrated that more risky choices were unnecessary. Of course there are a myriad of other courses and training that can be undertaken to learn the latest in soil science, plant phenology and health, the soil food web, permaculture, and climate change adaptation strategies.

Clean out the cupboard

There are several pesticides on the City's list which are outdated and not permitted in urban situations due to their toxicities and persistence in the environment. These chemicals include picloram, aminopyralid, clopyralid and amitrol. Dr. Mineau referred to picloram and amitrol as "dinosaurs" and was astounded that the City was still using such relics. Disposed of responsibly, there will be no temptation to continue their use. Doubtless review of the IPMP will identify others currently used, to join their ranks.

Adopt measures of other progressive municipalities and provinces

Calgary continues to be Canada's largest municipality without any protection from pesticide use. Seven provinces have enacted pesticide legislation to protect citizens and the environment from the toxic effects of pesticides. The Ontario *Cosmetic Pesticide Act* (2008) is the gold standard for provincial legislation. The *Act* was modelled on bylaws for the municipalities of Toronto and Peterborough; these also represent best practices for other jurisdictions which have adopted cosmetic pesticide bylaws across the country.

At the very least, we would like to see the City adopt and enforce a "white list" of least-toxic pesticides for use on green spaces in Calgary, mirroring Ontario's Class 11 (Appendix 1).

The preferred solution recommended by Healthy Calgary and PCN is a cosmetic pesticide bylaw to protect human health and the environment from toxic pesticide exposures. Voluntary adoption has never been as effective as regulation combined with education.

Resurrection of least-toxic pesticide committee

In the absence of an imminent cosmetic pesticide bylaw, Healthy Calgary would like to see the resurrection of a committee with regular meetings similar to the Pesticide sub-committee of the now disbanded Environmental Advisory Council. The pesticide sub-committee was created in 1999, after a proposed cosmetic pesticide bylaw failed to pass the Standing Policy Committee on Community and Protective Services. This would ensure that pesticide data is received on a timely basis, trends are ascertained, strategies and techniques are evaluated, standards are upheld and implementation of least toxic-methods of pest control are ongoing.

Hire knowledgeable weed inspectors

Move the focus, time, energy and toxic pesticides from non-legislated weeds to the restricted noxious weeds on the Alberta Weed List, using of course the least-toxic methods of control. Rapid detection and response by qualified and knowledgeable weed inspectors will reduce the occurrence and proliferation of regulated invasive plants before they become a problem, thereby reducing the amount of pesticides used. The last-known and sole weed inspector in Calgary retired some years ago.

Conclusion

Once again Healthy Calgary and Prevent Cancer Now commend the City of Calgary for inviting participation in the review of the City's Integrated Pest Management Plan (1998). For over 30 years concerned citizens in Calgary have been working tirelessly and diligently in efforts to reduce known human health and environmental impacts from many of the very pesticides that the City regularly uses. It is time to adopt "common sense measures" to protect the health and future of our children.

We look forward to next steps, for a healthier Calgary.

Respectfully Submitted by:

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Appendix 1. Least-toxic options permitted for “cosmetic” uses under Ontario’s Pesticides Act (<https://www.ontario.ca/page/class-11-pesticides>). Ingredients used by Calgary are in bold.

Ingredients contained in pesticide products that are biopesticides or certain lower risk pesticides. Licensed exterminators and persons who perform land exterminations in non-residential areas that use Class 11 pesticides are required to post a notice sign to provide public notice of the use of these pesticides, unless exempt from posting under Ontario Regulation 63/09.

Number	Active Ingredient Name
1	Acetic acid
2	Ammonium soaps of fatty acids
3	Ammonium soaps of higher fatty acids
4	Aureobasidium pullulans strain dsm 14940
5	Aureobasidium pullulans strain dsm 14941
6	Azadirachtin
7	Bacillus subtilis mbi 600
8	Bacillus subtilis qst 713
9	Bacillus thuringiensis kurstaki
10	Bacillus thuringiensis tenebrionis
11	Boracic acid (boric acid)
12	Borax
13	Brassica hirta white mustard seed powder
14	Capsaicin
15	Castor oil
16	Chondrostereum purpureum strain pfc2139
17	Citric acid (present as fermentation products of lactobacillus rhamnosus strain r-11, lactobacillus casei strain r215, lactococcus lactis ssp. cremoris strain m11/csl, lactococcus lactis ssp. lactis strain ll102/csl, and lactococcus lactis ssp. lactis strain ll64/csl)
18	Codling moth and leaf roller pheromone
19	Copper as elemental, present as tribasic copper sulphate
20	Copper as elemental, (from picro cupric ammonium formate and tannate complex)
21	Copper, present as copper octanoate
22	Copper as elemental, present as copper oxychloride
23	Corn gluten meal
24	Diallyl disulfide and related sulfides
25	Dried blood
26	Dried whole eggs
27	Extract of reynoutria sachalinensis
28	Fatty acid
29	Fish meal mixture
30	Fish oil mixture
31	Garlic
32	Hydrogen peroxide
33	Iron (present as fehedta)
34	Iron (ferrous or ferric) phosphate
35	Iron (ferrous or ferric) sulfate
36	Iron (ferrous or ferric) sodium
37	Kaolin
38	Lactic acid (present as fermentation products of lactobacillus rhamnosus strain r-11,

Number	Active Ingredient Name
	<i>Lactobacillus casei</i> strain r215, <i>Lactococcus lactis</i> ssp. <i>cremoris</i> strain m11/csl, <i>Lactococcus lactis</i> ssp. <i>lactis</i> strain l1102/csl, and <i>Lactococcus lactis</i> ssp. <i>lactis</i> strain l164/csl)
39	Lime sulphur or calcium polysulphide
40	Liquid corn gluten
41	Meat meal mixture
42	<i>Metarhizium anisopliae</i> strain f-52
43	Methyl-anthranilate
44	Mono-and di-potassium salts of phosphorous acid
45	Mono-and dibasic sodium, potassium, and ammonium phosphites
46	Mineral oil (herbicidal or plant growth regulator or insecticidal or adjuvant)
47	Nuclear polyhedrosis virus of douglas fir tussock
48	Nuclear polyhedrosis virus of the gypsy moth
49	Nuclear polyhedrosis virus of red-headed pine sawfly
50	Oil of black pepper
51	<i>Pantoea agglomerans</i> strain c9-1
52	<i>Pantoea agglomerans</i> strain e325
53	<i>Phoma macrostoma</i> strain 94-44b
54	Piperine
55	Putrescent whole egg solid
56	<i>Sclerotinia minor</i>
57	Silicon dioxide -present as diatomaceous earth - salt water fossils
58	Soap (alkanolamine salts of fatty acid)
59	Soap (potassium salts of fatty acid)
60	Sodium chloride
61	Sodium alpha-olefin sulfonate
62	<i>Streptomyces acidiscabies</i> strain rl-110t and thaxtomin a
63	Sulphur
64	<i>Trichoderma virens</i> strain g-41
65	<i>Trichoderma harzianum</i> rifai strain krl-ag2
66	<i>Trichoderma harzianum</i> rifai strain t22
67	<i>Typhula phacorrhiza</i> strain 94671
68	<i>Verticillium albo-atrum</i> strain wcs850
69	Wintergreen oil

Appendix 2. Dr. Sears' recommendations to the Parliamentary Standing Committee on Health regarding the *Pest Control Products Act* (2002)

1. **The Precautionary Principle and Substitution Principle are necessary in risk management.** The *PCPA* requires a two-stage process: to assess the risk, then to manage it (e.g. by requiring gloves and a mask, or by restricting use to commercial applicators, or to agriculture). The Precautionary Principle is currently mentioned for risk assessment. Responsible risk management would include demonstrating the need for a product and its superiority in terms of health and environmental impacts, over other means to achieve the end.
2. **Public notice, involvement and access to information are necessary before an assessment is basically complete.** Interested and concerned members of the public are asked to provide comment following near-finalization of the assessment, but during a window of time when they cannot access the actual data upon which the assessment is based. Information in the Reading Room is inaccessible prior to final registration. This also means that data is not available on pesticides under temporary registrations (too many pesticides, for too long, as others have undoubtedly indicated).
3. Information availability is illogical. The minutiae of pesticides data is available only after the fact and only to someone equipped with pencil, paper and affidavit and able to visit in person at Riverside and Heron (to use old computers with unsearchable files). The leap from minutiae to the conclusions—the PMRA's actual data evaluation—is not available, not even in the Reading Room. I visited Health Canada three times to examine data on 2,4-D, and I was one of the Reading Room trial group. The reason the data evaluation is not provided is that it is not considered to be the "data" as prescribed in the *Act*. **The *PCPA* should be amended to prescribe public access to data evaluations, at the time the public is being asked for comment.** This information should properly be publicly available online, but at least available in the Reading Room. I have asked the infoserve how many individuals have visited the Reading Room, how many times; the infoserve has not yet responded.
4. Whether the Reading Room information is sufficiently available to be considered *publicly* accessible is debatable. I cited information from the Reading Room in an article for peer review, and the *Canadian Medical Association Journal* determined that data from the Reading Room was too inaccessible for peer review. **Accessibility of information in the Reading Room should be improved, to the extent that it can contribute to public science.**
5. I work in systematic review of scientific evidence, and the PMRA (indeed, much of Health Canada) does not have the mandate, expertise, infrastructure or informational support to properly, systematically review epidemiological evidence, using modern methods and according to modern standards. Doing this properly would probably be more efficient, faster and less expensive than present methods, as they can be discerned from outside. **Scientific best practices – modern systematic scientific review and reporting methods – should be required under the *PCPA*.**
6. The PMRA should, but does not, require complete environmental breakdown information, to CO₂, H₂O etc. For example, neonicotinoid breakdown is truncated at 6-chloronicotinic acid, just short of the highly problematic 2-chloropyridine. **Comprehensive environmental and metabolic fate data should be required under the *PCPA*.**
7. The PMRA does not comprehensively consider toxicity of breakdown products. This is not captured in animal toxicology, because the breakdown products are cleaned out of animals' cages; obviously, the breakdown products are present in the environment. **Comprehensive assessment of the toxicity of breakdown products should be required under the *PCPA*.**
8. Contaminants resulting from manufacturing processes such as dioxins in phenoxy herbicides, that are modifiable using process controls (e.g. slightly lowering the temperature), must be measured independently. You cannot rely on the proponent to provide contaminant/purity information that will reflect what is on the shelf (e.g. an Australian Broadcasting Corp. analysis of the herbicide 2,4-D found high dioxins just like the "bad old days," but data submitted by manufacturers to the PMRA and their Australian counterpart – analyses of selected production runs – was evidently acceptable. Dioxin analyses were inexplicitly

classified as confidential business information. **Independent analyses of off-the-shelf products should be required under the PCPA.**

9. Issuing permission to spread a toxic material in the environment essentially poses a public/environmental health hypothesis that this will not result in adverse effects. Health Canada has a moral, and should have a legal, obligation to follow up when it registers a pesticide. Determination that a pesticide poses an "acceptable risk" is inevitably based upon data with some substantial uncertainties and limited applicability to "real life." Health Canada should be required to have in place tracking of pesticide sales and use, levels of parent and breakdown products in "real life" soil, water, air, foods, wildlife and people, and comprehensive health and environmental data to allow the verification or refutation of this hypothesis that is embodied in the registration. Data should be reported by the PMRA, and should be publicly available so that epidemiologists can do their work. **Pesticide and breakdown product environmental, food and human ongoing data collection and reporting, along with outcomes (e.g. bee die-offs, birth defects etc.), should be mandatory under the PCPA, to validate or refute the PMRAs hypothesis that risk is indeed "acceptable."**

An example is how to explore emerging public health concerns related to pesticide use. One issue of particular importance to Canada is mobilization of toxic elements as a result of the chelating action of glyphosate herbicide (in the commercial product "Roundup"). Mobilization of toxic elements such as lead, cadmium, mercury and others, into water and foods, is of increasing concern because glyphosate use escalated with "roundup ready" crops, and glyphosate is now being used to kill and dry down wheat, pre-harvest. There are high levels of cadmium in some areas of the prairies, as well as fertilizer, and grains tend to hyperaccumulate cadmium even without glyphosate added to the mix. Unlike much of the world, Canada lacks standards for cadmium in foods, and our wheat cannot always meet European standards. Epidemic kidney disease (an organ greatly affected by cadmium) is affecting Sri Lanka and other areas with this mixture of exposures. Cadmium exerts a broad range of toxic effects and is very potent even at low levels. *Without data, we cannot detect potential problems before a health epidemic ensues.*

10. Genetically modified crops are in fact pesticides, or produce novel proteins to withstand high doses of pesticides. **Genetically modified crops should be examined under the PCPA.**
11. **Pre-mixed pesticide products** (e.g. phenoxy herbicide/glyphosate/glufosinate mixes to deal with the debacle of resistant weeds) **should undergo a complete assessment.** Interactions are well known in medicine and toxicology, and cannot always be predicted. The testing has to be carried out.
12. I, and others, have **strong concerns regarding access to information, and timely response to information requests, objections and requests for review.** I wait for months for responses, and some questions are never answered despite repeated requests. The PMRA took a year to respond, in a limited fashion, to an objection I filed. At the same time, information such as pdfs of reports is only available via email. It is odd to pay employees to forward documents that should rightfully be posted online.
13. **Scientific review requires information and library services.** One example of a cut to information services that directly affects the PMRA, as well as scientists and civil society organizations, is discontinuation of the Homologa subscription. This may yield a small savings but represents another in the series of disabling cuts to federal scientific information services. This makes it impossible for federal civil servants to do their job, ultimately to ensure a healthy, productive population. Safeguarding health is essential, in order to avoid the economic and social drag of disability, and costly healthcare for chronic illnesses and cancer.

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City of Calgary Review of Integrated Pest Management Plan (1998)

Submission regarding the evaluation of pesticide toxicity and children's health

Submitted by: Dr. Joyce M. Woods RN, BN, BA, MEd, PhD

Date: Feb 3, 2016

Attention: Steven Snell, MRes, MCIP, RPP, City of Calgary, Conservation Policy Team Lead

Via: email

First of all, it is so encouraging to hear that the City of Calgary Council has directed Administration to evaluate pesticide toxicity with the goal of eliminating the use of the more toxic pesticides on City-owned land as it has been many years since this was last discussed. Calgary has been criticized in the past for not protecting its citizens from toxic pesticides despite the awareness that these chemicals have long been linked to serious diseases, disorders and other health-related concerns.

Of greatest concern for me is the impact these chemicals have on children's health. I am pleased to submit my position as a concerned citizen, a long-standing health care worker and as an Advisory Board member for the Coalition for a Healthy Calgary. I will speak from the position of having studied the impact of toxic chemicals on our health with a special interest in children's health for more than twenty years.

I have authored a book called "Indoor Air Pollution... The Silent Killer" and developed two courses for Mount Royal University related to chemicals and the impact they have on our health. The first course was entitled "Children's Environmental Health..., *children run better unleaded*" which was developed for Continuing Education and the second is called Integrative Healing Practices and speaks to environmental impacts on health. This second course is delivered in both the Nursing and Midwifery Program and the Integrative Health Coach Program for Continuing Education. I spent many years presenting seminars throughout North America on environmental wellness, served on the Advisory Board for the Integrative Health Institute at Mount Royal University for seven years and as an Advisory Board Member for the Coalition

for a Healthy Calgary for eight years. I am also listed on the Experts Directory at Mount Royal University to address issues identified by the City and community on environmental concerns. Most recognized of these concerns was the asbestos incident in the Harry Hays Building and the mice infestation in a local food chain. I have been employed by Mount Royal University for seventeen years as an Associate Professor, Department of Nursing and Midwifery.

We have far too long overlooked the health of our children not recognizing the trends that have occurred over the past years. Disturbing health care trends already well-researched and documented show us that the effects of environmental toxins on children's health could turn out to be one of the largest public health crises we will ever face. Much of the delay for attending to this very serious problem is related to the fact that it takes many years to realize the consequences of toxic exposures. Decades later, we begin to see epidemics of diseases we refer to as "*new*" or "*rising*" and at that time we look back and see a correlation between exposure to certain toxic chemicals and these epidemics of disease and disorders.

We have seen this scenario before with cigarette smoke, asbestos, lead additives, bisphenol A (hormone disruptors), PBCs, DDT and hundreds of consumer products promoted as safe and nontoxic until it was discovered how dangerous they were - this is far too late. Let me refer to the Precautionary Principle". This Principle states that if an action or policy has a suspected risk of causing morally unacceptable harm to the public, or to the environment, in uncertainty or the absence of scientific consensus or understanding, the "*burden of proof*" that it is not harmful falls on those taking that action -- that means the persons who are responsible for making those decisions shall also take action to avoid or diminish that harm. "*Morally unacceptable*" refers to: threatening to human life or health, having serious or effectively irreversible health effects and/or imposed without adequate consideration of the human rights of those affected. This Principle clearly denotes a duty to prevent harm when it is within our power to do so. Advocates of this approach not only see it as a means of "*preventing morally acceptable harm to the public*" but as a means of fast-tracking inherently toxic contaminants towards regulatory phase-down and ultimately a total phase-out.

Earlier decisions to ban substances were examples of standards that recognized the “*inherent toxicity*” of the substances in question. In the majority of these cases, evidence of morally unacceptable harm was only suspected, difficult or impossible to prove, and strongly contested by the industries responsible for the production of these substances and ultimately, the contamination.

In making public health policy decisions, it is important to recognize that the majority of occupational standards for toxic contaminants were derived from animal testing which means that standards for environmental exposure could have been set at 10 to 100 times the level for human exposure in occupational or environmental settings. This notion of using “safety factors” in order to set standards for chemical exposures at levels 10 times, 100 times, etc., lower than the level where health effects are known or detected continues to be a key aspect of ever-more refined standard setting approaches to this day. Out of this practice comes the term “*threshold*” - the level at which a health effect is detected. Considerable debate continues over whether or not morally unacceptable health effects occur below these thresholds, once again, a strong reason for applying the Precautionary Principle.

There is now much scientific evidence to support the long standing belief of many researchers that pesticide use has both immediate and long-term impacts on human health, and especially the health of children. It is so important to differentiate the impact of toxic chemicals on children as they are much more vulnerable in so many ways. So often we think of children as “*little adults*”; this is a serious mistake as children are so much more impacted by exposure to toxic chemicals.

Published data from a variety of reputable sources strongly suggest a link between toxic exposure, developmental abnormalities, and a variety of chronic diseases and disorders in children. Several factors make children particularly vulnerable to toxic contaminants including increased exposure, immature detoxifying systems, and timing in children's critical developmental growth stages when exposures would normally occur.

Children are generally more susceptible to the toxic effects of pesticides because of their immature stage of neurological development. We have known for some time that the blood brain barrier does not fully close until about the age of two and there is now considerable scientific evidence that the brain is not fully formed until the age of 12. Because of this very slow development, childhood exposure to very common pesticides may greatly impact the development of the nervous system resulting in numerous health problems. Children's ability to detoxify chemicals is also not as efficient as in adults as they have immature enzymatic defense (antioxidant) pathways coupled with limited intake of detoxifying nutrients.

There are many things to consider about children when we look at the impact of pesticides. They have a much greater skin surface for their size than adults so absorb proportionally a greater amount of all toxic substances they are exposed to through their skin, lungs and intestinal tracts. Because children breathe faster than adults they take in more air. They also take in more food and water per pound of body weight than adults. Scientific evidence has also shown us that children do not fully develop their immune systems or detoxifying mechanisms until early teenage years greatly reducing their ability to fight the introduction of toxic contaminants into their system.

Many toxins are absorbed through the skin and stored in fatty tissue. Children have a much higher proportion of fatty tissue per body size than adults increasing their vulnerability.

Children are also much closer to the ground than adults and often engage in activities that have contact with ground and grass -- this is how they explore and get to know the world. Very young children tend to put their hands or other things in their mouths which further increases their exposure to toxic pesticides. It is this combination of increased exposure to pesticides and the lack of defenses related to bodily development to combat the toxic effects of pesticides that puts children at such a high risk.

The vulnerability of children is also enhanced as they experience all types of changes in their hormonal

chemistry, especially during puberty. When the rapid shifts in growth occur during puberty, important endocrine signals need to occur in a very precise fashion. The disruption of these hormonal messages is highly suspected for the reason girls are going through puberty at such an early age. We are commonly witnessing girls beginning menstrual periods at 8 years of age even though they are not yet ovulating -- a suspected strong connection to additional years of exposure to unopposed estrogen -- a risk factor for breast cancer. Organophosphate pesticides are ubiquitous environmental toxins that have been linked to damage of the brain and nervous system, especially in young children.

Toxic chemicals are being produced at a rate that is impossible to test for human safety and without a doubt, many of these toxins end up inside our children's bodies making adherence to the Precautionary Principle so much more critical.

Years of study have continued to connect toxic chemicals to many of the "*new*" or "*rising*" health problems we are now seeing in children. Let me remind you of some of the disturbing health trends we have seen in children over the past 30-40 years that should certainly make us wonder "*what has changed*".

There has been a dramatic increase in a range of health conditions over the past few decades including birth defects, childhood cancers, immune disorders, autoimmune diseases, endocrine and reproductive disorder as well as a huge increase in neuropsychiatric problems such as autism, attention-deficit hyperactivity disorder (ADHS) and attention-deficit disorder (ADD).

We are understanding that these increases may relate to a number of factors including overconsumption of the wrong types of foods, lack of proper nutrition, deficient immunological education related to excessive hygiene, overuse of antibiotics, mood regulators and a wide-variety of pharmaceuticals, often used in excess. However, within this list of causative factors is the issue of environmental toxicity and it must be examined carefully.

Birth defects have been increasing -- especially genital defects in boys. Research has also shown a link between the increase in the incidence of hypospadias (urethra does not grow all the way to the tip of the penis during fetal development) and increase in undescended or undersized testicles and exposures to environmental toxins.

There has been a dramatic increase in certain childhood cancers, especially lymphoblastic leukemias and brain cancers; both systems very vulnerable to environment exposures. Although cancer in childhood is rare compared with cancer in adults, it is the second most common cause of death, after injuries and accidents, among children 1 to 19 years of age. Studies have connected the rise in incidence of childhood cancers to exposure to a wide range of toxins in the environment including pesticides.

Asthma is also increasing dramatically, especially in children similarly to the peanut and tree nut allergies which have more than doubled in children. Researchers have recognized that multiple factors need to be considered but environmental toxins remain highly suspect. In the past 20 years it is well established that several environmental pollutants that are found outdoors and indoors exacerbate asthma. Certain environmental factors may also contribute to the development of asthma.

A number of environmental chemicals have been linked to Type 2 Diabetes, a disease that is also becoming dramatically more prevalent in children. This correlates directly with the rise in childhood obesity. A variety of environmental chemicals have come to be referred to as "obesogens". These chemicals interfere with the feedback loop that tells the child that he or she has had enough to eat, so they just keep on eating. These chemicals are also suspected disruptors of a brain-behavior mechanism in metabolism that leads to increased insulin secretion and decreased insulin sensitivity and ultimately puts on more body fat.

Overall, the biggest area of concern in children is the dramatic increase in behavioral and neuropsychiatric problems. A lot of this focus has been on autism, aggressive behaviors and serious mental disorders which has tripled since the early 1990s. Few studies have looked explicitly at the

relationship between ADHD and exposures to environmental contaminants. However, evidence supports a hypothesis that environmental contaminants may contribute to some portion of the incidence of ADHD, based on studies focusing on specific symptoms or types of behavior associated with ADHD. Many studies have found relationships between behavioral problems—including attention problems, hyperactivity, and impulsivity. Along with the increase in ADD and ADHS, there has been a marked increase in depression and bipolar disorders amongst children.

Children are being prescribed antipsychotic medication, antidepressant medications and are often taking several at one time. These powerful medications affect their metabolism in many different ways as well as their quality of life.

This was clearly not the case 30 years ago. We need to ask “why are so many children agitated today requiring all types of medications to calm them down? This is a very sad problem and we all know it has to be addressed. We desperately need to determine the connection between environmental toxins and the dramatic rise in childhood disease and disorders. Never in history have children lived with this kind of total body burden of environmental toxins. Sadly, if we continue in this way, we are participating in conducting a major uncontrolled experiment on our children with no end in sight. This may draw similarities for many of you to the “*canaries in the coal mines*”. This phrase alone serves as an early warning sign of a coming crisis. More specifically, it refers to information that was common knowledge for earlier generations but not addressed.

As we reflect on all the changes in children’s health that have occurred over the past 30-40 years, and recognize the dramatic increase in existing and new children’s diseases and disorders we need to be sure we are not asking “*what is the matter with these children*”. Instead, we need to ask “*what matters to these children*”, and hopefully, this will ethically and morally direct our actions.

My message is that we have to be aware of the problem before we can take action to solve it. In the meantime, applying the “Precautionary Principle” would be a great start. This principle shifts the

"burden of proof" from the general public who are often not aware to those who create public health policies related to environmental risk. We can do something about this issue and it "can" make a difference. Our children's futures are at stake. So, ultimately, this is a message of hope rather than of despair. Hopefully..., it will not fall on deaf ears.

Respectfully submitted by

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Please see Appendix A - Studies involving exposure to pesticides

In this Appendix, you will see several studies related to pesticides that are on the list of use by the City of Calgary, i.e. glyphosate and dicamba

Appendix A - Studies involving exposure to pesticides

1. In 2015, WHO (World Health Organization) found that there was sufficient evidence of carcinogenicity in

experimental organisms to classify glyphosate, the active ingredient in the most popular lawn care brand

(Roundup) as "probably carcinogenic to humans" (Group 2A). WHO also found that 2,4-D- found in many

'weed and feed' products- is possibly carcinogenic.

[IARC. IARC Monographs Volume 112: evaluation of five organophosphate insecticides and herbicides. 20 march 2015. <http://www.iarc.fr/en/media-centre/iarcnews/pdf/MonographVolume112.pdf>; and IARC. Carcinogenicity of lindane, DDT, and 2,4-dichlorophenoxyacetic acid. The Lancet Oncology, 16(8).p891-892.

2. A 2010 meta-analysis of 15 studies on residential pesticide use and childhood leukemia finds an

association with exposure during pregnancy, as well as to insecticides and herbicides. An association is also

found for exposure to insecticides during childhood.

Turner, M.C., et al. 2010. Residential pesticides and childhood leukemia: a systematic review and meta-analysis. Environ Health Perspect 118(1):33-41

3. A 2013 study suggests that preconception pesticide exposure, and possibly exposure during pregnancy, is associated with an increased risk of childhood brain tumors.

Green KR, Peters S, Bailey HD. 2013) Exposure to pesticides and the risk of childhood brain tumors. Cancer Causes Control. DOI 10.1007/s10552-013-0205-1

4. According to a 2015 study, living in agricultural regions is linked to increased leukemia and central nervous system cancers in children.

Booth BJ, Ward MH, Turyk ME, et al. 2015. Agricultural crop density and risk of childhood cancer in the midwestern United States: an ecologic study. Environmental Health:14(82)

5. A meta-analysis study by scientists at the Harvard University's School of Public Health finds that children's exposure to pesticides in and around the home results in an increased risk of developing certain

childhood cancers. Authors found that cancer risks were connected most closely to the type of pesticide used and the location where it was applied.

Chen M, Chi-Hsuan C, Tao L, et al. 2015. Residential Exposure to Pesticide During Childhood and Childhood Cancers: A Meta-Analysis. Pediatrics. DOI: 10.1542/peds.2015-0006

6. The probability of an effect such as cancer, which requires a period of time to develop after exposure, is

enhanced if exposure occurs early in life.

Vasselinovitch, S., et al. 1979. "Neoplastic Response of Mouse Tissues During Perinatal Age Periods and Its Significance in Chemical Carcinogenesis," Perinatal Carcinogenesis, National Cancer Institute Monograph 51.

7. A study published by the American Cancer Society finds an increased risk for non-Hodgkin's lymphoma

(NHL) in people exposed to common herbicides and fungicides, particularly the weedkiller mecoprop

(MCP). People exposed to glyphosate (Roundup®) are 2.7 times more likely to develop NHL.

Hardell, L., et al. 1999 Mar. "A Case-Control Study of Non-Hodgkins Lymphoma and Exposure to Pesticides," J of the Am Cancer Soc, (85):6. p.1353.

8. 75 out of all 99 human studies done on lymphoma and pesticides find a link between the two.

Osburn, S. 2001. Do Pesticides Cause Lymphoma? Lymphoma Foundation of America, Chevy Chase, MD.

9. Four peer-reviewed studies demonstrate the ability of glyphosate-containing herbicides to cause genetic

damage to DNA (mutagenicity), even at very low concentration levels.

Cox C. 2004 Winter. "Glyphosate." Journal Of Pesticide Reform Vol. 24 (4).

10. A 2007 study published in Environmental Health Perspectives finds that children born to mothers living

in households with pesticide use during pregnancy had over twice as much risk of getting cancer, specifically

acute leukemia (AL) or non-Hodgkin lymphoma (NHL).

Rudant, J. et al. 2007. Household Exposure to Pesticides and Risk of Childhood Hematopoietic Malignancies: The ESCALE Study (SFCE). Environ Health Perspect. 115:1787–1793.

11. A 2007 Canadian report shows that a greater environmental risk exists for boys, specifically when it comes to cancer, asthma, learning and behavioral disorders, birth defects and testicular dysgenesis syndrome.

Canadian Partnership For Children's Health and Environment. 2007. A Father's Day Report - Men, Boys And Environmental Health Threats. www.healthyenvironmentforkids.ca.

12. Children, asthma and pesticides. Researchers find that pesticides may increase the risk of developing

asthma, exacerbate a previous asthmatic condition or even trigger asthma attacks by increasing bronchial

hyper-responsiveness.

Hernández, AF, Parrón, T. and Alarcón, R. 2011. Pesticides and asthma. Curr Opin Allergy Clin Immunol. 11(2):90-6

13. One 2015 farmworker study found an association between early-life exposure to OPs and respiratory symptoms consistent with possible asthma in childhood.

Raanan R, Harley KG, Balmes JR, et al. 2015. Early-life exposure to organophosphate pesticides and pediatric respiratory symptoms in the CHAMACOS cohort. Environ Health Perspect. 123(2):179-85.

14. A 2012 study concluded that prenatal PBO exposure was associated with childhood cough in inner city children.

Liu B, Jung KH, Horton MK, et al. 2012. Prenatal exposure to pesticide ingredient piperonyl butoxide and childhood cough in an urban cohort, Environ Int. 48:156-61.

15 . A 2004 study finds that young infants and toddlers exposed to herbicides (weedkillers) within their first year of life are 4.5 times more likely to develop asthma by the age of five, and almost 2.5 times more likely when exposed to insecticides.

Salam, MT, et al. 2004. "Early Life Environmental Risk Factors for Asthma: Findings from the Children's Health Study." Environmental Health Perspectives 112(6): 760.

16. EPA material safety data sheets for the common herbicides 2,4-D, mecoprop, dicamba, (often combined

as Trimec®) and glyphosate (Roundup®) list them as respiratory irritants that can cause irritation to skin and

mucous membranes, chest burning, coughing, nausea and vomiting.

17. Scientists believe that the amount of toxic chemicals in the environment that cause developmental and

neurological damage are contributing to the rise of physical and mental effects being found in children.

National Research Council. 2000. Scientific frontiers in developmental toxicology and risk assessment. Washington, DC: National Academy Press; Physicians for Social Responsibility, The National Environmental Trust, and the Learning Disabilities Association of America. 2000. Polluting our future: Chemical pollution in the U.S. that affects child development and learning. http://www.net.org/health/tri_report.pdf (accessed 6/2/05).

18. According to researchers at the University of California Berkeley School of Public Health, exposure to

pesticides while in the womb may increase the odds that a child will have attention deficit hyperactivity disorder (ADHD).

Marks AR, Harley K, Bradman A, Kogut K, Barr DB, Johnson C, et al. 2010. Organophosphate Pesticide Exposure and Attention in Young Mexican-American Children: The CHAMACOS Study. Environ Health Perspect 118:1768-1774.

19. Studies show children's developing organs create "early windows of great vulnerability" during which

exposure to pesticides can cause great damage.

Landrigan, P.J., L Claudio, SB Markowitz, et al. 1999. "Pesticides and inner-city children: exposures, risks, and prevention." Environmental Health Perspectives 107 (Suppl 3): 431-437.

20. A Beyond Pesticides Fact Sheet (such as "weed and feed" products) tested on mice show increased risk of infertility, miscarriage and birth defects at very low dosages.

Greenlee, A. et al. 2004. "Low-Dose Agrochemicals and Lawn-Care Pesticides Induce Developmental Toxicity in Murine Preimplantation Embryos," Environmental Health Perspectives 112(6): 703-709; Cavieres, M., et al. 2002. "Developmental toxicity of a commercial herbicide mixture in mice: Effects on embryo implantation and litter size." Environmental Health Perspectives 110:1081-1085.

21. Results from a CHARGE study finds that agricultural exposures to organophosphates at some point during gestation was associated with a 60% increased risk for autism higher for third-trimester exposures,

and second-trimester chlorpyrifos applications. Similarly, children of mothers residing near pyrethroid insecticide applications just before conception or during third trimester were at greater risk for both autism

and developmental delay.

Shelton, Geraghty, Tancredi. 2014. Neurodevelopmental Disorders and Prenatal Residential Proximity to Agricultural Pesticides: The CHARGE Study. Environmental Health Perspectives:122(10).

22. Researchers at the Cincinnati Children's Hospital Medical Center found an association between increasing pyrethroid pesticide exposure and ADHD which they conclude may be stronger for symptoms seen in boys compared to girls.

Wagner-Schuman, M, Richardson, J, Auinger, P et al. 2015. Association of pyrethroid pesticide exposure with attention-deficit/hyperactivity disorder in a nationally representative sample of U.S. children. Environmental Health. 14:44

23. Additional studies on lawn pesticide product formulations show effects on learning ability, aggressiveness, memory, motor skills and immune system function.

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Cox C. 2004. Journal Of Pesticide Reform Vol. 24 (4) citing: Garry, V.F. et al. 2002. "Birth defects, season of conception, and sex of children born to pesticide applicators living in the Red River Valley of Minnesota." Environmental Health Perspectives 110 (Suppl. 3):441-449.

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EPA. 2004 June. 2,4-D. HED's Human Health Risk Assessment for the Reregistration Eligibility Decision (RED). p7.

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all other age categories.

Centers for Disease Control and Prevention. 2003 Jan. Second National Report on Human Exposure to Environmental Chemicals

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indoor concentrations of pyrethroids, organophosphates and organochlorines pesticides which were detected in soil, dust and indoor air.

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January 31, 2016

Dear Mr. Snell:

Re: Calgary Pesticides Policy

Thank you for the opportunity to offer CAPE's thoughts on the health concerns associated with pesticides used on lawns and gardens and on the policies to be applied to pesticides used in the City of Calgary. While the City is currently examining its corporate policy for the use of pesticides on City-owned lands, some of our comments address municipal policies that can be applied to the use of pesticides on private property within the City.

By way of introduction, let me explain that CAPE is a non-profit organization that was established over two decades ago by physicians who understood the profound way in which the environment can impact human health. To this day, CAPE is run by a Board composed mostly of physicians and is supported by volunteer physicians in provinces across the country. We have a long history of work on pesticides.

Regulation of Pesticides in Canada

While the federal government has responsibility for the registration of pesticide products that can be used in Canada, provincial and municipal governments have gotten involved in the regulation of pesticides, particularly pesticides used for cosmetic purposes (i.e. on lawns, gardens and on greenspace), in response to health and environmental concerns associated with their use.

At the federal level, the Pest Management Regulatory Agency (**PMRA**), a branch of Health Canada, is responsible for registering pesticides using under the authority of the Pest Control Products Act (**PCPA**). Once a pesticide is registered, it may be used in Canada as long as its use is not contrary to the regulations under the PCPA or the directions on the product label. There is however little or no monitoring or enforcement of those regulations or of product use. There are also a number of serious health and environmental concerns associated with pesticides that have been registered for use. Many believe that the PMRA's process does not adequately protect the health of citizens or Canada's ecosystem. In 2015, the Commissioner of the Environment and Sustainable Development identified a number of concerns with the pesticide approval process run by the PMRA. For example, the Commissioner found that the PMRA: has been moving too slowly when re-evaluating

pesticides that have been on the market for more than 15 years; has not been assessing the cumulative health effects of pesticides in all of the situations where it should have been required; has not applied the 10-fold safety factor required to protect children and infants from pesticides in most situations where it should have been applied; has not been conducting special reviews promptly for pesticides banned by countries that are members of the Organisation for Economic Co-operation and Development (OECD); and has not moved quickly to cancel registrations for some pesticides when reviews demonstrate that they do pose “unacceptable risks” (Commissioner of the Environment and Sustainable Development, 2015).

For these reasons, provincial and municipal governments have gotten involved in the regulation of pesticides to limit their use, particularly when they are being used for cosmetic purposes. In this realm, provincial governments have the power to regulate both the use and sale of pesticides within their jurisdictions, while municipalities have the power to regulate the use of pesticides within their municipal boundaries. Despite the limitations on these powers, many provinces and municipalities have implemented pesticide laws that have effectively limited the use of toxic pesticides with strong public support.

Health Concerns associated with Pesticides

Toronto Public Health, Health Review, 2002: The health concerns associated with pesticides have been well established. In 2002, Toronto Public Health (TPH) conducted a systematic review of 300 pesticide health studies from peer-reviewed scientific journals. These studies were epidemiological studies directed at people exposed to pesticides through their work or in their homes. The occupational studies suggested that pesticides can moderately increase the risks for some cancers, some reproductive effects, and some neurological effects. A limited number of studies directed at children suggested that pesticides can moderately increase the risks of some cancers (leukemia, non-Hodgkin’s lymphoma, and neuroblastoma) and some birth defects among children who are exposed around conception, in utero, and in early postnatal life (TPH, 2002).

Canadian Family Physician, Cancer Review, 2007: Another systematic review, published in 2007, examined 83 health studies directed at pesticide exposures and cancer health effects that were published between 1992 and 2003. This review excluded organochlorine pesticides that are no longer used in Canada. The review found that pesticide exposures were associated with the development of some cancers, particularly brain, prostate, and kidney cancers, as well as non-hodgkin’s lymphoma and leukemia. The reviewers noted that a number of studies directed at children found an increased risk of cancer associated with critical periods of exposure, both prenatal and post-natal, and with parental exposure to pesticides at work (Bassil et al., 2007). The authors concluded that there was sufficient evidence to recommend that patients reduce their use of pesticides.

Ontario College of Family Physicians, Non-Cancer Review, 2012: In 2012, researchers working in collaboration with the Ontario College of Family Physicians (OCFP), conducted a systematic review of the health studies published on the non-cancer health effects associated with pesticides after 2003. This study identified and reviewed 142 high-quality studies. Organochlorine pesticides were excluded from this study as well. The reviewers found evidence that pesticides may cause deleterious reproductive outcomes. The strongest correlation was for low birth weights among infants – a condition which is associated with greater risks of death, disease, and disability in infancy and childhood, and long-term adverse health outcomes in adult life. In addition,

it found that prenatal pesticide exposures were consistently associated with measurable deficits in the neuro-development of children across a wide range of ages from birth to adolescence. The reviewers noted that, while the increased risks of these childhood deficits are very small, small increases in the incidence of these types of childhood conditions can have a substantial impact on the healthcare system and on the learning and earning potential of the affected individuals. The reviewers also found evidence that exposure to pesticides, and to organophosphate or carbamate insecticides in particular, is associated with the development of respiratory symptoms and a spectrum of obstructive and restrictive lung diseases. They concluded that there is a need to: minimize pesticide exposures among pregnant women and children from all potential sources, including dietary, indoor and outdoor air, water, and farm and domestic use exposures; and reduce or eliminate exposure to all pesticide types, and to organophosphate, carbamate, and organochlorine insecticides in particular, in both occupational and domestic settings (OCCP, 2012).

Chief Public Health Office, Prince Edward Island, Health Impacts, 2015: In 2015, the Prince Edward Island Chief Public Health Office produced a systematic review of the health literature related to pesticides. Over 340 peer-reviewed studies, published between 2004 and 2015, were reviewed in this study. The reviewers found that pesticide exposures were associated with reproductive outcomes such as cleft palate, congenital defects, neural tube defects, and gastrochisis in children. They also found that pesticides are associated with neurological effects. They found evidence linking pesticides to increased rates of Parkinson's disease, Amyotrophic Lateral Sclerosis (ALS), abnormal reflexes in newborns, depression, Alzheimer's disease and other mental health conditions (Chief Public Health Office, 2015). The authors found good evidence that pesticide exposures are associated with non-hodgkin's lymphoma (NHL), LCH (Langerhans cell histiocytosis), some types of leukemia, and cutaneous melanoma among adults. They found that there was good evidence that pesticide exposures were associated with lymphoma, brain cancer, Ewing's sarcoma, neuroblastoma and leukemia in children. This review also found moderate evidence to support associations between any pesticide exposure with brain cancers, gastrointestinal cancers, lung cancers, and cancers of the reproductive tract, among others. The reviewer recommended that steps should be taken to reduce the use of, and exposure to, pesticides for the general population and vulnerable groups, such as pregnant women and children (PEI, 2015).

Specific Pesticides and Groups of Pesticides: A large number of health and environmental studies have also been directed at specific pesticides such as glyphosates and on groups of pesticides such as neonicotinoids and pyrethroids. I have attached CAPE backgrounders which summarize the health and environmental concerns associated with glyphosates, neonicotinoids and pyrethroids.

Provincial and Municipal Laws directed at Cosmetic Pesticides

In 2016, CAPE conducted a review of provincial laws and a number of municipal by-laws that have been adopted across the country to limit the cosmetic use of pesticides. That report, which can be downloaded at <https://cape.ca/wp-content/uploads/2016/08/Pesticides-Policy-Report-FINAL.pdf>, found that, at present, seven provinces and 180 municipalities have laws that prohibit the use of some pesticides for cosmetic purposes on private property within their jurisdictions. Alberta is one of only three provinces that does not have a provincial law prohibiting the use of toxic pesticides on lawns, gardens and greenspace.

Because there are hundreds of pest control products on the market, many jurisdictions ban cosmetic pesticides based on active ingredients. Most provinces have created 'black lists' that identify the active ingredients that are

prohibited from being used or sold for cosmetic purposes. Provinces such as Ontario, Nova Scotia and Manitoba have created 'white lists' that identify the pesticides that are allowed to be used for cosmetic purposes. In these cases, a new pesticide ingredient cannot be used for cosmetic purposes unless the manufacturer proves that it meets the criteria identified in the law. In Ontario, for example, pesticides can only be added to the "white list" if they: have a non-toxic mode of action; they are of low toxicity to organisms the product is not targeting; they do not persist in the environment; the product is used in ways that do not cause significant exposure; and they have been widely available to the public for other uses for some time (CAPE, 2016).

Most laws banning the cosmetic use of pesticides identify exceptions where the prohibited pesticides are allowed to be used. The exceptions that are commonly found in municipal laws apply to pesticides used to: protect public health and safety from animals that bite, sting, or carry disease; control plants that are poisonous to humans by touch (e.g., poison ivy); control plants, animals, or fungi that pose a risk to a building or structure; purify water and disinfect swimming pools; treat golf courses and lawn bowling greens; manage pests in indoor environments; manage agricultural land and agricultural farmhouse property; and sports fields and specialty turfs (CAPE, 2016).

While Integrated Pest Management (**IPM**) is recognized as a sound practice in principle, there are concerns that the practice can allow the use of toxic pesticides more frequently than they are required. Many believe that the principle underlying the practice can be realized more effectively with policies that clearly circumscribe what pesticides can be used and under what circumstances. Experience in provinces such as Ontario, where prohibitions have been in place for several years, has indicated that toxic pesticides are needed far less often than commonly thought by residents and park managers (CAPE, 2016).

Provincial and Municipal Laws have been Effective

Evaluation studies conducted on municipal and provincial laws prohibiting the cosmetic use of pesticides on private property have found that they can effectively reduce the use of pesticides and the levels of pesticides circulating through the environment:

- A Toronto study found that the use of pesticides on lawns by residents decreased by approximately 57% after Toronto implemented its municipal bylaw (TPH, 2009); and
- In Ontario, the provincial law prohibiting the use of pesticides on private property significantly reduced the concentration of common active ingredients in water bodies. Post-ban measurements revealed significant decreases in the concentration of 2,4-D (by 81%), dicamba (by 83%), and MCPP (by 81%) in water bodies. Glyphosate and carbaryl levels, which are used more in agricultural settings, showed no significant changes (Todd, 2011).

Strong Public Support for Ban on Pesticide Use on Lawns

We have found that there is a strong appetite for action on cosmetic pesticides within Alberta. In August 2016, CAPE in partnership with several other organizations, contracted OraclePoll Research to conduct an opinion poll in Alberta to determine the level of support for action on pesticides used for lawns and gardens. For the survey, 1000 Albertans were interviewed providing results that are considered accurate 19 times out

of 20. The poll found that nearly 7 out of 10 Albertans believe that cosmetic pesticides pose a threat to the health of their children and their pets. It also found that 62% of Albertans would support a provincial law that “phases out the use and sale of all but the safest pesticides for lawns and gardens in Alberta” (<https://cape.ca/wp-content/uploads/2016/10/Press-Pest-AB-Poll-Oct-2016-Final.pdf>).

Conclusions:

There is a robust body of evidence which demonstrates that pesticides can be harmful to human health, particularly to the most vulnerable members of our communities. Systematic reviews of health studies directed at pesticides, conducted by public health authorities, the Ontario College of Family Physicians, and researchers have identified links between pesticides and a variety of cancers, neurological health impacts, reproductive effects, and respiratory conditions. These reviews have found that children are most vulnerable to the adverse effects of pesticides during pregnancy and early in life. We know that pesticides used on lawns, gardens and greenspace can be tracked into homes on shoes and clothes. We know that children can be exposed to pesticides by getting them on their skin, in their mouths, and by inhaling them.

Over 230 municipalities (counting the bylaws in Ontario that were superceded by the provincial law) have phased out the use of pesticides on corporate property and then implemented bylaws phasing out their use on private property across their jurisdictions. They have done so because most people agree that the potential for harm outweighs the need for perfect lawns and gardens. The few evaluation studies that have been done have demonstrated that these bylaws can be very effective at reducing the use of pesticides, and thereby reducing the potential for exposure to pesticides.

Yours truly,



Kim Perrotta

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February 6, 2017

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Dear Mr. Snell,

This is in response to your inquiry from December 7, 2016, regarding insight on pesticide toxicity and use in an urban environment.

The City of Edmonton does not have a toxicologist on staff to provide input on pesticide toxicity. When it comes to pesticide safety we rely on the federal and provincial regulatory processes. We commit to only use products approved by Health Canada's Pest Management Regulatory Agency (PMRA). For staff training and competency, as well as product applications, we strictly follow provincial legislation such as the Pesticide Sales, Handling, Use and Application Regulation, the Pesticide (Ministerial) Regulation and the Environmental Code of Practice for Pesticides.

In addition to following regulatory requirements, the City of Edmonton has several programs in place to address citizens' concerns around pesticide exposure:

- The newest and probably most impactful change has been the implementation of an herbicide ban with exemptions on City-owned land in the summer of 2015. An important part of this ban is the recognition of the need of herbicides for various situations and not implementing a full ban on all herbicide use. Important exemptions are for the control of regulated weeds and the protection of city assets such as hard infrastructure. More details on the ban and its exemptions can be found on our web page at edmonton.ca/herbicides.
- We are reducing tree canopy spraying by adopting newer application technologies and tree injection techniques for conventional insecticide use against a number of pests to reduce exposure risk to bystanders as well as conserve all-important natural enemies of the pests.
- Where we use pesticides with a high chance of public exposure (such as open parks and sports fields) we sign the treated area, providing information on what products have been used, what pests have been treated, and when.
- At the beginning of each day, locations of all our city crews' and our contractor's pesticide spray activities are made available to the public via recordings on a public access phone line.
- Concerned residents can sign up for various programs that assure a pesticide/herbicide-free buffer around their property and/or a notification if any treatments are scheduled within a certain buffer

around their property. More on those programs can be found in the reducing exposure to pesticides section of edmonton.ca/weeds web page

- Any herbicide treatments conducted around schools are only done during summer months when school is out
- We keep a 30m herbicide-free buffer around playgrounds, water spray parks and registered day-cares at all times
- A more or less market-driven change (the limited availability of Dursban for urban environments) was the switch to a mosquito control program that focuses on BTI products. BTI is unfortunately not as effective, especially in cooler spring days where the feeding activity of mosquito larvae is reduced
- Developing a GPS tracking system for mosquito larvicide applications. This data would eventually be shareable with the public real-time, to increase openness regarding exactly where insecticides are being used
- Increasing the mosquito larvicide-free buffer from residential buildings from 30m to 40m, further reducing potential public exposure

Similar to Calgary, the City of Edmonton also has an IPM policy in place and follows an integrated approach to pest management. Often understood as a pesticide reduction policy, our goal is in fact not to eliminate pesticides completely but rather use them in the most responsible way. It is important to recognize that there are situations where pesticides are the only effective control option. We also employ alternative pest control options such as mowing, digging, community weed pulls and the establishment/enhancement of bio-control populations where appropriate. Each pest situation is different and it is our strong belief that a true integrated pest management approach should look at all possible control options, including a combination of options and allow for the most environmentally responsible, effective and efficient solution.

Driven by our ISO 14001 certified Environmental Management System, we consider continual improvement and a critical review of all our pest management programs to be key components of an environmentally responsible approach to our business. This also includes maintaining a good network with industry and legislative partners as well as attending industry and scientific conferences to stay on top of new developments. To this regard, the City of Edmonton also leads an Integrated Pest Management Task Force with representation from PMRA, Alberta Environment and Parks, Alberta Health Services and all internal City of Edmonton business units that are involved in pest management. IPM initiatives are shared and current pest management problems are discussed in monthly meetings to find the most appropriate solutions.

In regards to your question on potential means to reduce the use of “toxic” pesticides, we would like to share a few of our short- and long-term initiatives:

- Evaluating a new heat treatment called “Foamstream” for the control of vegetation growing in sidewalk cracks
- Expand alternative weed control options such as biocontrols for selected weed species
- Diversification of our urban forest to make it less susceptible to tree pest invasions
- Increase soil depth in our landscaping standards to assure better turf/tree health and therefore more pest resistance

- More focus on monitoring and early detection of pests such as weeds, invasive species threats to the urban forest, cyanobacteria blooms, and other bacterial water quality issues in lakes with planned water sport activities
- Inform residents about effective alternative pest control options on private property

We hope this information is helpful for your planned IPM plan revision. Please feel free to contact us if you have any further questions.

If possible, we would be very interested to receive a copy of your revised IPM plan once it is finalized.

Sincerely,

A handwritten signature in dark ink, appearing to read "Chris Saunders", followed by a horizontal line.

Chris Saunders
Management Supervisor for Environment and Training
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City Operations
City of Edmonton