PREVENT CANCER NOW

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Protect health and the environment:
Eliminate glyphosate (and other herbicides) from Ontario forestry

We are writing to support modernization of Ontario forestry by elimination of herbicides, in particular glyphosate. This is being carried forward by Joel Theriault, in the context of the Cousens Plan.

CONTEXT

Climate imperatives highlight needs to support healthy, resilient, bio-diverse lands in Northern Ontario. Modernization of herbicide-free forestry, as in Quebec since 2001, should be a priority as forestry plans are put in place. Chemically culling important species destabilizes rather than supports health of forests and all inhabitants.

Climate extremes are increasing more quickly at higher latitudes, necessitating increasing precautions to protect biodiversity and thereby support resilience.

Northern Ontario's forests, including wetlands, streams, rivers and lakes, are a rich home for diverse species. These species are interdependent – biodiversity lends stability and resilience to ecosystems, including acting as firebreaks.

For many generations Ontario's Boreal Forest has provided food and medicine. These species are susceptible to herbicides, and should remain pristine for use.

Forestry has become a mainstay of economic activities, and it is possible to carry out forestry as in other jurisdictions, without spraying herbicides.

HERBICIDES IN FORESTRY

Many herbicides have been used in herbicides over the decades, including chlorinated herbicides dating back to defoliants in warfare. When herbicides are used, one modern choice in Ontario forests has been glyphosate, that is free of dioxins seen in phenoxy herbicides such as 2,4-D. Thus, glyphosate based herbicides is the focus of this summary.

The one study of a population in a relatively pesticide-free environment being sprayed with glyphosate clearly demonstrated that genetic damage results.[1]

Since glyphosate has been identified as a probable carcinogen and having other toxic effects, other newer herbicides may be used on roadsides. These may cause adverse health and environmental repercussions as well; however, the present document will focus on glyphosate. Discussion of other chemicals may be provided as necessary, should other herbicides be considered in forestry.

GLYPHOSATE

Chemistry

Glyphosate is a small molecule, that is highly bioactive. It has been patented as a broad-spectrum herbicide, an antibiotic, and a chelator (having the capability to mobilize metals into water, making toxic elements such as cadmium, lead and mercury available to plants and other species in the environment). Effects of this remarkable chemical can thus be wide-ranging.

Chemical effects and implications

Antimicrobial Effects on the Microbiome

The myriad microbes in the intestine include species that are more or less beneficial, and this microbiome directly impacts health. Intestinal microbiota digest food, manufacture essential nutrients, modulate the immune system and affect the nervous system. This all may be affected by glyphosate as well as other toxic and beneficial exposures.[2]

Glyphosate has been reported to disrupt the microbiome of birds,[3] rodents,[4,5,6] and honey bees.[7] On the other hand, removal of glyphosate from the diet may relieve intestinal dysbiosis, because some beneficial bacteria are susceptible, while pathogenic *Clostridia* and *Salmonella* strains are resistant.[2] [There is only anecdotal evidence of improvement of IBD in humans with food from countries where glyphosate is restricted, or with change to an organic diet; fecal transplants may provide relief.]

Inflammatory bowel disease (IBD) can result from intestinal dysbiosis, and Canada's children under six years of age are unfortunately among the top sufferers in the world, with IBD increasing 7% per year.[8] It is probably not unrelated, that colorectal cancer is increasing at 6-7% per year in Canadian adolescents and young adults.[9,10] These astounding increases in life-changing and life-limiting conditions in the young require broad-based precautionary approaches, including avoidance of glyphosate in food, water and air.

The soil microbiome may also be affected, with reports of increased fungal disease species including *Fusarium* (toxic black mould that can rot plants, and render grains and other foods highly hazardous).[11,12] Productivity of nutritious plants and the health benefits versus risks of foods are thus affected by glyphosate. This could also apply to berries and other edible plants that survive or recolonize following glyphosate spraying of logged lands.

Fertility and Birth Outcomes

Exposure to glyphosate during pregnancy may shorten gestation.

An early (2001) Health Canada led study found preliminary evidence of increased risk of spontaneous abortion with glyphosate exposure.[13] In 2018, a California study replicated association of exposures to glyphosate applications with increased risk of pre-term birth (particularly of females),[14] and in an Indiana cohort a strong association was reported between urinary glyphosate levels (a better indicator of exposure) and shortened pregnancy.[15]

Hormone-like Activities (Endocrine disruption)

One of the potential reasons behind glyphosate effects on gestation, and a sex-linked specificity, is that it affects hormone activities. Laboratory studies have been varied, with early demonstration of glyphosate-induced growth of human breast cancer cells,[16] with some demonstrations of glyphosate (but not adjuvants) exerting indirect effects on hormone activities affecting the gonodal (sex-linked)[17] and thyroid axes.

A detailed animal study pin-pointed the importance of timing, with early life exposures being particular important in disruption of thyroid signalling and normal metabolism.[18] Early life exposures are well known to potentially alter the trajectory of physical and intellectual development throughout life.

Does Glyphosate Cause Cancer?

Yes, according to independent scientists and U.S. courts; no, according to most regulators.

The World Health Organization's (WHO) International Agency for Research on Cancer (IARC) found in 2015 that glyphosate is a category 2A probable carcinogen, based on: *sufficient* evidence of carcinogenicity in animals, *limited* evidence of carcinogenicity in humans and *strong* evidence for two carcinogenic mechanisms.[19] This led to retrenching by the European and American regulatory assessors, despite serious gaps in data that was included and other deficiencies in evaluations. This was in turn thoroughly disputed by 94 prominent scientists, including Canadian expertise in epidemiology, occupational and public health, in a commentary published the Journal of Epidemiology and Community Health.[20]

Regulatory bodies such as Health Canada's Pest Management Regulatory Agency (PMRA) rely largely upon confidential (not available to IARC), industry sponsored and supplied studies, to determine with there is a health effect that is both "established" and "adverse." No major regulatory body has concluded that glyphosate is a carcinogen. As discussed by Benbrook, this is in part because IARC and regulatory bodies consider very different bodies of evidence, and in part because occupational risks trigger requirements for protective gear, rather than decreased use.[21]

Prevent Cancer Now was among several that objected to the PMRA re-registration of glyphosate. After a year and a half the PMRA summarily dismissed all objections, with no citations of science – not even relevant studies that had been published in the intervening time. An appeal by *Safe Food Matters* is before the courts, while banning of glyphosate in some European jurisdictions may trigger another review.

The U.S. Agency for Toxic Substances and Disease Registry is a non-regulatory federal public health agency of the U.S. Department of Health and Human Services. In April 2019 the ATSDR published a Toxicological Profile for Glyphosate, and its 257 pages contain the most comprehensive publicly available review regarding glyphosate.[22] In the current U.S. political climate one might speculate that had this report stated that glyphosate causes cancer it would not have been published. Nevertheless, meta-analyses clearly indicate that glyphosate is significantly linked to increased risk of non-Hodgkin's lymphoma (Figure 2-4; p 86; pdf p 99) and increased risk of multiple myeloma (Figure 2-5; p 87; pdf p 100).

The California law firm Baum Hedlund Arestei Goldman has so far won several law suits against Monsanto/Bayer, in favour of individuals who developed lymphoma following repeated application of glyphosate-based herbicides (Roundup). This firm hosts an enormous repository of scientific documents as well as EPA/industry communications showing prior knowledge that glyphosate causes cancer, and collusion to achieve and maintain registration of glyphosate. https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/monsanto-secret-documents/ High awards were in part because of Monsanto's prior knowledge of the hazards of glyphosate. It is to be considered whether with this knowledge, any parties to further use of glyphosate might be culpable. U.S. class actions are now being settled.

Chelation

In Ontario, consumption guidelines recommend limiting exposure to toxic chemicals including mercury from fish (originating from chlor-alkali plants associated with old pulp mills, methylmercury forms in sediments then is absorbed by fish from the water and food) and cadmium from ungulates (organ meat of deer and moose; cadmium can accumulate from soils in particular browse plants such as willow and poplar). Theoretically, glyphosate may alter mobility, movement into water and uptake by plants, of toxic metals in soils such as mercury, cadmium and lead. Thus, not only does glyphosate kill food for wildlife, it may contribute to higher levels of toxic elements in surviving organisms.

Public and Occupational Health

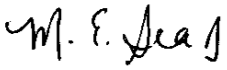
Given that glyphosate has been the most-used herbicide in Canada for decades, it is surprising that we have no federal data on the body burden of this chemical. Canada's flagship study, the Canadian Health Measures Survey, is slated to report on glyphosate in 2025. Without exposure data, it is impossible to relate changes in public health to chemicals in air, water and food.

Successful U.S. litigation has brought awards of millions of dollars for professional applicators. In the context of forestry, it is important also to consider liabilities connected with long term health of those who are carrying out spraying on foot, by truck and by plane, as well as tree planters working on sprayed territories.

ABOUT US

Prevent Cancer Now is a volunteer civil society organization of scientists, medical practitioners, other professionals and concerned citizens, working to stop cancer before it starts. We carry out public education, conduct scientific analyses, participate in public consultations, and partner with others to further science-based decisions and laws.

Sincerely,



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