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Canadian Federal Pesticide Regulation: Why Other Levels of Government Require Least-Toxic Approaches to Pest Control

Many Canadian jurisdictions restrict the use of registered pesticides, surpassing federal label requirements. This summary is to help you understand why this is happening.

Pesticides are products that destroy or control "pests," which are defined as organisms that are "harmful, noxious or troublesome." Pesticides include herbicides against plants, insecticides, fungicides, rodenticides, etc. Health Canada's Pest Management Regulatory Agency (PMRA) regulates pesticides, under the *Pest Control Products Act* (PCPA).[1] The PMRA uses a two-step process of hazard identification and then risk management, registering all products deemed to pose "acceptable risks" according to scientific assessments.

While the PMRA registers products for sale and use, provincial and municipal governments are responsible to qualify and licence applicators, and can further restrict pesticides to protect human and environmental health. The most progressive jurisdictions such as Ontario (population 14 million) require least-toxic approaches, particularly for "cosmetic" uses in turf care and landscaping.

Scientific limitations of Canadian federal pesticide regulation

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 publicly available, 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, and does not systematically assess the existing science.[2,3] Rather, it conducts a paper audit of data submitted by the pesticide manufacturers. Unfortunately, the PMRA assessment of human health 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 and further generations. 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.** The regulatory system actually dissuades companies from doing low-dose, environmentally relevant testing, because any findings of adverse effects 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 have already been found to disrupt the endocrine or hormone systems.[4] Hormones orchestrate every step of development from gestation through the entire lifespan. Endocrine-disrupting chemicals act at extremely low concentrations in the body, and can have different, even opposite effects at higher doses.[5] 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.[4] A second study confirmed previously known androgen (male hormone) effects of some pesticides,[6] 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.[7] The Endocrine Society – a global group of medical science professionals [8] – published in 2015 a 150-page updated research review and statement calling for attention to endocrine-disrupting chemicals.[5]

4. **Only active ingredients are tested – not the products on the shelf.** Products can contain more than one pesticide ingredient. As well, 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 product. 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 pure pesticide active ingredient without formulants.[9]

5. **Pesticides are not tested in combination.** While we know that chemicals can act very differently in combination, only single pesticides 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.** Methods and standards are developed for systematic review in environmental health (e.g., by the US National Toxicology Program[3,10]). Real-life study of the effects of pesticides is difficult, and the PMRA dismisses this information as showing only correlation and not as the level of causation requiring protective action. The PMRA is of the opinion that it is virtually impossible to *prove* that chronic pesticide exposures cause harm to humans, leaving the federal regulator relying upon industry-supplied high-dose animal testing. As reported in 2017 in the prestigious journal *Science*, ignoring the majority of the science is the status quo among regulators.[11]

8. **Precautionary Principle is *not* up front.** Health Canada and industry groups point out that the Precautionary Principle is incorporated in the *Pest Control Products Act*. In fact, this is quite limited because precautionary approaches are only incorporated late in the process, during risk management, such as determinations of permissible exposures (noted below, an additional margin introduced in 2002, to protect the most vulnerable, is not even being implemented). Application of the Precautionary Principle to the first step – hazard identification – could potentially push the process towards least-toxic choices. On the other hand, industry representatives have been known to turn this approach upside-down, advocating precaution against rushing to remove “tools from the toolbox” before being 100% certain that they are causing substantial harm.

Federal audits of Health Canada’s pesticide management

The Federal Commissioner of the Environment and Sustainability in the 2015 audit of pest control products found glaring deficiencies and concerns regarding pesticide registration.[12] Some concerns are as follows:

- The 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 the 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.

- The 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.
- An additional "uncertainty factor" to protect the most vulnerable individuals, introduced to the *Pest Control Products Act* in 2002, is very rarely incorporated in assessments.

For more information, please contact *Prevent Cancer Now*.
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References

1. Legislative Services Branch. Consolidated federal laws of Canada, Pest Control Products Act. (2016). Available at: http://laws-lois.justice.gc.ca/eng/acts/P-9.01/. (Accessed: 9th February 2017)
2. Sears, M., Walker, C. R., van der Jagt, R. H. & Claman, P. Pesticide assessment: Protecting public health on the home turf. *Paediatr. Child Health* **11,** 229–234 (2006).
3. Whaley, P. *et al.* Implementing systematic review techniques in chemical risk assessment: Challenges, opportunities and recommendations. *Environ. Int.* **92–93,** 556–564 (2016).
4. Mnif, W. *et al.* Effect of Endocrine Disruptor Pesticides: A Review. *Int. J. Environ. Res. Public. Health* **8,** 2265–2303 (2011).
5. Gore, A. C. *et al.* EDC-2: The Endocrine Society's Second Scientific Statement on Endocrine-Disrupting Chemicals. *Endocr. Rev.* **36,** E1–E150 (2015).
6. Orton, F., Rosivatz, E., Scholze, M. & Kortenkamp, A. Widely Used Pesticides with Previously Unknown Endocrine Activity Revealed as in Vitro Antiandrogens. *Environ. Health Perspect.* **119,** 794–800 (2011).
7. Vandenberg, L. N. *et al.* Hormones and Endocrine-Disrupting Chemicals: Low-Dose Effects and Nonmonotonic Dose Responses. *Endocr. Rev.* **33,** 378–455 (2012).
8. Endocrine Society. Current Scientific Statements. (2015). Available at: https://www.endocrine.org/endocrine-press/scientific-statements. (Accessed: 10th February 2017)

9. Mesnage, R. *et al.* Major Pesticides Are More Toxic to Human Cells Than Their Declared Active Principles. *BioMed Res. Int.* **2014,** e179691 (2014).
10. Rooney, A. A., Boyles, A. L., Wolfe, M. S., Bucher, J. R. & Thayer, K. A. Systematic Review and Evidence Integration for Literature-Based Environmental Health Science Assessments. *Environ. Health Perspect.* **122,** 711–718 (2014).
11. Cornwall, W. Rules of evidence. *Science* **355,** 564–567 (2017).
12. Office of the Auditor General of Canada Government of Canada. Report 1—Pesticide Safety. (2016). Available at: http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201601_01_e_41015.html. (Accessed: 24th November 2016)

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