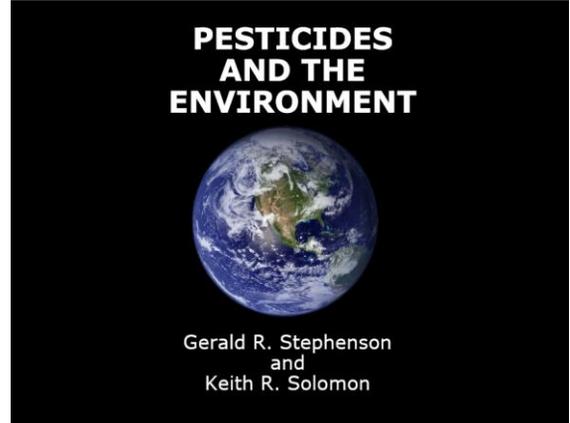


Use of pesticides for managing pests in gardens and landscapes

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Aesthetics



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Aesthetics



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Aesthetics



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What are pesticides

- **Pesticides**
 - By law - substances or things that control or mitigate pests.
- **Pesticidal substances**
 - Very large range of substances.
 - Wide range of biological and physical properties.
 - They cause effects in target organisms.
 - Some very toxic to non-target organisms, some essentially innocuous.



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Registration of pesticides

- To be used in Canada, all pesticides must be registered.
 - Extensive testing is required.
 - Current, as well as historical, review and re-review in Canada (PMRA), USA (EPA), European Union, and other jurisdictions (FAO, WHO).
 - Must be done under good laboratory guidelines.
 - Must be subjected to quality assurance.

Same agency that approves pharmaceuticals

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Review of testing

- Regulators use the precautionary approach to set guidelines for humans.
 - Safety (uncertainty) factors.
 - 10 x for animals to humans.
 - 10 x for human to human.
 - Up to 10 x additional factor (children) US FQPA, PMRA.
- Regulators develop recommendations for exposures.
 - Acceptable Daily Intake (ADI).
 - Reference Dose (RfD).
 - Environmental exposure guidelines.

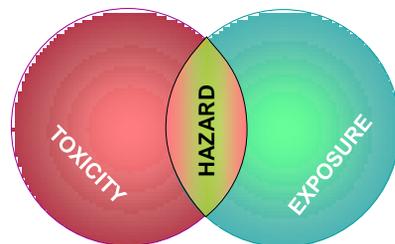
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Environmental effects

- Most are non-persistent
- Only short-term on the target organisms
 - Have to be used more than once per season
 - Rapid reinvasion by weeds and insects
- Non-target organisms
 - Herbicides have low toxicity to non-target animals and have few non-target effects in plants unless deliberately sprayed

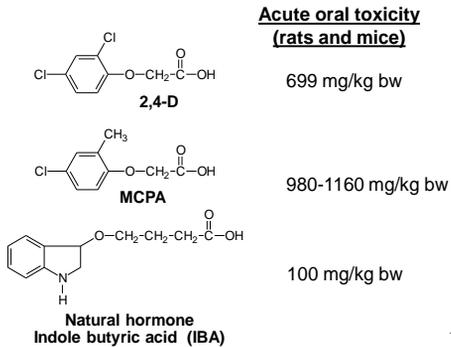
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Hazards from chemicals



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Natural is not necessarily safe

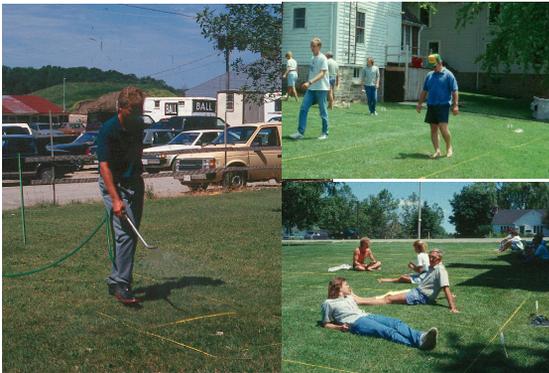


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Exposure studies

- **APPLICATORS** (highest exposures).
 - Required for farm applicators.
 - USA, Canada, other jurisdictions.
 - Other uses (professional and homeowner) by special tests or extrapolation.
- **FOOD**
 - Food monitoring programs and guidelines.
- **WATER**
 - Monitoring and guidelines.

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Conclusions re. exposure

- Homeowner and professional applicator exposure well below regulatory guidelines
- Protective clothing reduced exposure under all conditions of use.
- Applicator exposure caused by spills and contact with spray
- No exposure of bystanders to home or professional applicators - infrequent in air
- Reentry exposures well below regulatory guidelines - a 24-48 h re-entry period reduces this to negligible amounts

See Stephenson et al. 2010

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Genesis of the ban in Ontario – Report of the Ontario College of Family Physicians (OCFP)

- A small team mainly composed of family physicians and graduate students, but with epidemiological expertise.
- Reviewed the literature on the human health effects of pesticides published in the period 1992-2003.
- Funded by the Laidlaw Foundation
- **CONCLUDED:**
- Many of the studies showed statistically significant positive associations between pesticide exposure and solid tumors, non-Hodgkin's lymphoma (NHL), leukemia, as well as consistent effects linking pesticide exposure to disorders of the nervous system.

OCFP. 2004. *Systematic Review of Pesticide Human Health Effects*. Toronto: Ontario College of Family Physicians. Report 179 p

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Report of the Ontario College of Family Physicians (OCFP)

- Based only on epidemiology
- Omitted many studies
- Did not consider toxicological data
- Did not consider exposures
- Did not consider published regulatory reviews from PMRA and the US EPA

Pesticides and effects in humans

EPIDEMIOLOGY

- Study of diseases in humans in relation to environmental exposures.
- Good organisms to study but difficult to work with.
- For some substances it is difficult to measure exposures historically or in the long-term.
- Studies rely on correlation to suggest links.
- Cannot establish causality on their own.



Opinions on the OCFP study

UK Advisory Committee on Pesticides

- "Its failure to take account of all or even most of the relevant epidemiological evidence, and the biases inherent in the way in which material was picked out for inclusion";
- "Inadequate attention to exposure characteristics and relevant toxicology when interpreting reported associations".
- "Its superficial synthesis of evidence, which inadequately explored the impact of the strengths and weaknesses of individual studies".
- Overall, the ACP concluded that "the report does not raise any new concerns about pesticide safety that were not already being addressed, and does not indicate any need for additional regulatory action in the UK".

Advisory Committee on Pesticides. 2004. Pesticides Literature Review published by the Ontario College of Family Physicians. London, UK: UK Advisory Committee on Pesticides. 3 p
<http://www.pesticides.gov.uk/acp.asp?id=1389>

Opinions on the OCFP study



ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION

CHAIR: SIR TOM BLUNDELL FRS, FMedSci

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Opinions on the OCFP study

UK Royal Commission on Environmental Pollution

- Independent review of the Ontario study by Dr Michael Burr, University of Wales College of Medicine concluded that:
- "The authors had insufficiently addressed the issue of publication bias, and the review seemed to over-interpret the findings, given the limitations of the relevant studies".
- "Strong conclusions were being drawn from evidence that was of rather weak quality".
- Dr. Burr concluded that it was "difficult to assess the likelihood and strength of causal effects in the various associations reported".

Blundell T, (Chair). 2005. Crop Spraying and the Health of Residents and Bystanders. London, UK: Royal Commission on Environmental Pollution. 184 p www.rcsep.org.uk

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Other opinions on pesticides and cancer



Given the lack of evidence linking pesticide exposure to human cancer risk, no cases of cancer can be attributed to either occupational or non-occupational exposure to this group of agents.

IARC. 2007. Attributable Causes of Cancer in France in the Year 2000. Leon, France: International Agency for Research on Cancer. Report Working Group Reports Volume 3. 177 p

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Cancer

- Age-adjusted cancer incidence rates in Canada have remained constant or decreased for all major form of cancer.
- Breast and prostate cancer rates have increased, most probably as a result of better diagnosis and/or changes in lifestyle
- No evidence of any causal link between pesticide use and cancer
- Childhood cancers have not increased in Canada

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Should domestic and landscape uses of pesticides be banned?

- **Not for toxicological or health reasons**
 - For political reasons - OK, if you are honest enough to admit it
- **Consider the countervailing risks**
 - Costs
 - Risks of alternatives
- **Use pesticides properly**
 - By all means use Integrated Pest Management to reduce use but keep all options for pest management available

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THANK YOU