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Professor Keith Solomon is a Professor in the Department of Environmental Biology at the University of Guelph and is also Director of the Centre for Toxicology.

Professor Solomon teaches courses in toxicology and pesticides and ecological risk assessment at the University of Guelph. He directs an active program of research into the fate and effects of pesticides and other substances in the environment, exposure of humans to pesticides and industrial chemicals, and ecological risk assessment. He currently serves on several advisory committees on matters related to environmental toxicology and risk assessment of pesticides and other substances in Canada, the USA, Europe, and for the United Nations Environmental Programme. He is an active member of the Society of Environmental Toxicology and Chemistry, the American Chemical Society, and the Toxicology Forum.

He is the recipient of the 1993 Society for Environmental Toxicology and Chemistry award for Environmental Education, was elected as a Fellow of the Academy of Toxicological Sciences in December 1999, and is recipient of the American Chemical Society International Award for Research in Agrochemicals presented by the Agrochemicals Division of the American Chemical Society, 2002.

He is a Graduate of Rhodes University in Chemistry and Zoology and holds M.Sc. degrees from Rhodes University and the University of Illinois as well as a Ph.D. from Illinois. He has more than 30 years of experience in research and teaching in pesticide science and environmental toxicology and has contributed to more than 150 scientific publications and reports in the fields of pesticides, environmental toxicology, and risk assessment.

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Ban the pesticide bans;
Politics, not science, is behind the interest in stopping the use of pesticides

The emotional argument concerning so-called "cosmetic use" of pesticides in our gardens has been a controversial topic for many years. Extremist views on both sides have dominated the discussion and the public, which has the right to expect factual information, has instead been besieged by headlines and reports which have little basis in scientific fact. The following are key issues that the public needs to know about.

Not all pesticides are the same. By law, pesticides are substances or things that control pests. The definition of pesticides is very broad: more than 700 are registered for control of pests from weeds to rodents. Like pharmaceuticals, they have a wide spectrum of chemical

and biological properties and they may be synthetic or natural. What they have in common is that they cause effects in target organisms (pests). Some are very toxic to nontarget organisms while others are essentially innocuous. To treat all pesticides as if they were the same is incorrect, especially when we know so much about them.

All pesticides are tested and reviewed before being put on the market. The results of these tests are reviewed and re-reviewed on a regular basis in Canada (Pest Management Regulatory Agency), the United States (Environmental Protection Agency), European Union, and other jurisdictions (FAO, WHO). This process is similar to that for drugs and food additives, except that pesticide testing also addresses environmental fate and effects. Testing must be done under good laboratory practice guidelines and must be subjected to quality assurance before it is acceptable.

Regulators use the precautionary approach to set guidelines for exposure of humans and the environment to pesticides. The results of laboratory tests, usually the exposures that cause no effects in the most sensitive test organism, are used to set a maximum short-term or long-term exposure for humans or the environment. The exposure from the laboratory tests is divided by several uncertainty or safety factors when extrapolating to humans and the environment. These factors are multiplied together and range from 100- to 1,000-fold. In other words, the acceptable exposure for a human will be 100-fold to 1000-fold less than the dose that causes no effect in the most sensitive test animal. In addition, other data, such as epidemiology studies are also considered. The Canadian pesticide regulatory system is one of the best in the world.

Pests can be a real problem, even in home gardens. Most people have little idea of the large number of pest species that exist. For example, in Ontario, over 100 species of insects have been identified as pests of vegetable crops. There are dozens of pest species which attack other urban horticultural crops and ornamentals. Not all are present at epidemic levels all the time; however, management techniques must be in place to cope with an outbreak when it occurs. Pests can cause damage very quickly. Restricting the use and application of pesticides in domestic situations may result in costly damage to ornamental and other garden plants.

Landscape and home-use pesticides represent a small fraction of the pesticides used in agriculture. Generally, home-use products have lesser toxicity to mammals and other nontarget organisms, little persistence, and little mobility in the environment. They are only sold in small quantities and often in sealed direct-application packages. All of this reduces human and nontarget exposure -- the primary driver of risk -- allowing these products to be safely used. Potentially more hazardous products, such as agricultural pesticides, cannot be purchased or applied by a homeowner.

Studies on humans do not tell us much about risks of pesticides. This is a topic of much discussion and was precipitated by a report of the Ontario College of Family Physicians, which has since been published in the in-house journal of the Canadian College of Family Physicians. The report that was the basis for the publications was reviewed by two disinterested groups in the United Kingdom and found wanting. The U.K. advisory committee on pesticides remarked on the failure of the study 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. There was inadequate attention to exposure characteristics and relevant toxicology when interpreting reported associations. Overall, the advisory committee

on pesticides concluded that the report did not raise any new concerns about pesticide safety that were not already being addressed, and does not indicate any need for additional regulatory action. A review of the Ontario College of Family Physicians study by Dr. Michael Burr, University of Wales College of Medicine (at the request of the U.K. Royal Commission on Environmental Pollution) 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. The report was based on epidemiology studies and did not consider all of the other relevant information on pesticides, be it biological, toxicological, or chemical. Weighing of all the evidence is required in legal matters and was long ago recommended by leaders in the field such as Sir Richard Doll and Sir Austin Bradford Hill when, in the 1960s, they discovered the causal link between tobacco and lung cancer.

There are better ways to manage pests than to only use pesticides. Modern pest management programs are built around the concept of integrated pest management using a combination of nonchemical and chemical pest control methods. While chemicals are an important component of integrated pest management programs, it is sensible to use them only when necessary. For example, in 1987, Ontario initiated a 15-year program aimed at reducing agricultural pesticide use by 50 per cent, while still achieving effective pest control. This program, involving research and extension specialists, grower organizations, and the chemical industry, has been a remarkable success.

Urban landscape pest managers also can use integrated pest management and there is no question that chemical use could be reduced substantially with significant savings in cost for chemicals. This would involve education and community effort but would be less costly than the alternative.

There are no clear or compelling toxicological or health reasons to ban domestic pesticide use. However, if cities and provinces wish to do this for political reasons, it is their legal right; however, they should at the very least be honest enough to admit to this. There are infinitely more serious health issues facing Canadians and this debate on domestic pesticides is distracting from real risks to both adults and children. Pesticides should always be used properly and, by all means, use integrated pest management to reduce use but keep all the tools of pest management, including pesticides, in the box.