Consolidated List of Recommendations

In addition to the preceding summary of recommendations, the following list consolidates the recommendations made in Chapters 2, 4, 5, 6, 7, and in the two Case Studies. Only a selected list is included from the 45 recommendations in the Pesticides Case Study. As well, some recommendations are repeated since they are relevant in more than one chapter.

Chapter 2: Relationship Between Children's Health and Environmental Contaminants

1. Children's exposure to environmental contaminants needs to be more accurately characterized, estimated and assessed including baseline data on exposure, emissions, biomarkers and health effects. For children's exposure to pesticide residues in food, the 1993 United States National Research Council report clearly demonstrated that the data were incomplete, and that children differ from adults in terms of food consumption, both quantitatively and qualitatively. These differences and information gaps also occur for a variety of other contaminants and routes of exposure. A key part of the solution to this problem should be to mirror in Canada the data collection model used in the United States: the National Health and Nutrition Examination Survey (NHANES). In particular, efforts should include data collection similar to the proposed National Longitudinal Cohort of Environmental Impacts on Children and Families currently being designed by the Centers for Disease Control in Atlanta. Further, efforts to marry databases and expand this data collection system to include all of North America should be encouraged.

2. There is a need to enhance knowledge of the critical periods and vulnerable systems during development of the fetus, infant and child such that we can better prevent compromise to children's health throughout their lives. We know that lead exposure prior to age 2 has marked effects on nervous system development and behaviour. Better understanding is required as to the influence (if any) of endocrine disruptors and air pollutants at early stages in development, and whether they predispose children to health effects later in life.

3. There is a need for greater understanding of specific pediatric health problems that have an environmental basis and that are increasingly prevalent, including asthma, cancer, and perhaps, learning disabilities. For asthma in particular, which affects nearly 13% of Canadian children, a concerted research effort should be funded and promoted to investigate the links between asthma and both indoor and outdoor environments.

4. Attention must also be focused on identifying those children whose risk of exposure and/or susceptibility to environmental contaminants is compounded by other factors. Children from lower income families and aboriginal children, children whose parents work in occupations that expose them to contaminants that might be brought into the home, children residing in agricultural regions and the children of families that eat sport fish and wild game are all at heightened risk for exposure to environmental contaminants and subsequent environmental health problems. Additional research is necessary to determine links between environmental contamination, poverty and other broad determinants of health.

5. Although the federal government does provide some funding for research on children's environmental health (see Chapter 1), given the significant gaps in information identified in this study and through the preceding recommendations, the government should further support Canadian research that fills those data gaps. To that end, (and similar to the circumstances in the U.S.) we recommend that government-funded centres of excellence for the study of environmental health be established which would include children's health as an important focus. Such centres should encourage collaboration and coordination of research efforts between government and universities.

6. In the clinical setting, pediatric environmental health clinics should be established, within academic teaching hospitals, to provide a clinical service, to promote teaching of health professionals and to conduct appropriate health research. Such clinics should incorporate the information and methods recently promoted by the American Academy of Pediatrics in its Handbook of Pediatric Environmental Health.

7. Strategies to prevent environmental exposures should also become part of the clinical protocol for expectant and nursing mothers and parents with young children. Physicians, nurses, midwives and social workers need to be educated and patient materials need to be developed.

8. For pesticides in particular, and as also noted in the Pesticides Case Study, the difficulty must be recognized of identifying cases of exposure to pesticides in a clinical setting because of the non-specific nature of symptoms. Hence, university and college curricula must educate health professionals (including family physicians, pediatricians, obstetricians, midwives, and nurse practitioners) about the adverse health effects of pesticides (both acute and chronic). Further to the preceding two recommendations, an important part of such clinical education would be to learn environmental history taking similar to the methods recently promoted by the American Academy of Pediatrics in its Handbook of Pediatric Environmental Health. These strategies should also become part of the clinical protocol for expectant and nursing mothers and parents with young children.

Chapter 4: Risk Assessment and the Precautionary Principle

Risk Assessment

9. The use of "comparative risk assessment" and "cost-benefit analysis" in environmental standard-setting should be monitored and evaluated for effectiveness in environmental and health protection versus their narrower ability and purpose of cutting costs.

10. All regulatory agencies in the federal and provincial government need to explicitly acknowledge the scientific uncertainties and limitations of risk assessment for deriving environmental standards.

11. The harmonization (either NAFTA-imposed or as cost-saving measures) of Canadian pesticide standards with those being developed in the U.S. should be undertaken as a preliminary step towards, or at least should not undermine Canada's ability to move towards, more precautionary standards. Such standards should include more rigorous and stepwise application of child-protective safety factors during both exposure assessment and dose-response assessment, as well as assessments of aggregate exposure, cumulative and synergistic effects, and the ability to implement a full ban on persistent organic pollutants. Child-protective safety factors and a weight-of-evidence approach should continue through to the risk management stage of setting new or revised standards for pesticides and all environmental pollutants.

12. Further research is necessary regarding whether and how commitments made under international trade agreements constrain Canada's ability to set protective standards. In addition, given the influence on Canada of standard setting in the United States, further research is required to determine the degree to which final standards established in the United States are set at numbers influenced by the possibility of legal challenge, including on a constitutional basis, so as to be able to recognize when a resulting standard is weaker than it should be in the Canadian legal context.

13. The Canadian Pest Management Regulatory Agency, as part of a government-wide approach, should immediately implement a policy of refusing to accept from pesticide companies new or existing toxicity test data derived from experiments on human "volunteers."

Precautionary Principle

14. Although the federal government has committed to the precautionary principle in the *Canadian Environmental Protection Act*, the *Oceans Act*, and in other policy pronouncements, there is little evidence that the principle has been operationalized. It is therefore recommended that the federal government develop a national implementation strategy to further the precautionary principle that includes:

(a) Change in the burden of proof: a process that ensures that those parties creating a threat of harm, such as those that produce a new substance that is being assessed or that introduce new products, have the onus to establish that such substances or products are safe, rather than having government establish that they pose a risk of harm;

(b) Weight of evidence: a protocol that allows decisions at each step in a risk based decision-making process (i.e., during all stages of both risk assessment and risk management) to be based on the weight of evidence approach rather than waiting for an extremely high standard of proof;

(c) Pollution Prevention: a commitment to operationalize pollution prevention through the development of a regime for bans and phase-outs of inherently toxic substances as well as pollution prevention standards for industrial sectors;

(d) Just Transition: a commitment to ensure the application of the principles of Just Transition for workers affected by toxic substance phase-down and phase-out;

(e) Public Participation: in recognition of the political and ethical implications of environmental and risk-based decisions, a commitment to make these decision-making regimes more transparent and open to the involvement of the public.

15. At this time, there is little evidence in provincial law or policy that Ontario is committed to the precautionary principle. It is recommended that the province of Ontario development a regulatory commitment to the precautionary principle together with a strategy to operationalize the principle similar to that described in Recommendation 5 above.

16. It is recommended that both Ontario and Canada adopt a definition of the precautionary principle that is more expansive than the definition found in the Rio Declaration, and preferably one similar to that found in the *Wingspread Statement on the Precautionary Principle*, which states:

    When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically.

Chapter 5: Air

Air: Recommendations for Ontario

17. The Ontario standard setting plan is proceeding and should be encouraged to reach timely results with respect to the priority substances identified for review. However, the ultimate standards adopted in the group of eighteen contaminants currently under review and the fifteen yet to be proposed are highly dependant upon the approaches taken by Ontario in the next "risk management" stage of the process. The Ministry of the Environment should follow through with the development of a transparent, detailed and specific plan for finalization of these standards, as soon as possible. For carcinogens, the standards should in all cases be established at the risk level of no greater than ten to the minus six; with specific time frames for compliance being specified in the standard, if not immediately. No time frames should exceed five years for any substance, regardless of "implementation issues."

18. Research with respect to the evidence and data gaps for non-carcinogenic risks (for example endocrine disruptors and other health end-points) is a high priority for incorporation into standard-setting exercises and should be supported by the Ontario government.

19. Ontario should proceed with its own review of all of the priority air contaminants, originally identified, regardless of whether any of these are also in a Canada-Wide Standard or other federal provincial process. Ontario should ensure that all of the air contaminants in the province are regulated in the same manner and to the same risk levels.

20. Ontario should place special emphasis on standards for nitrous oxides and particulate matter in its own standard setting process because of the impact of these contaminants on children's health and because of the levels in which they are found in the Ontario environment.

21. Ontario should drastically improve its ozone commitment and should actively work to support a stringent ozone Annex between Canada and the United States.

22. Ontario should immediately repeal its plan with respect to emissions trading in the electricity sector and replace it with a plan that will ensure improved air quality from this sector within five years.

Air: Recommendations for Canada

23. The Canada-Wide Standards process under the Environmental Harmonization Accord Standard Setting Sub-Agreement is ineffective for protecting children's health and should be repealed with respect to air contaminants.

24. The Federal Minister of the Environment should establish standards on a health protective basis rather than pursuant to a Canada-wide consensus approach, and without risk management considerations.

25. Health protective standards should be published regardless of implementation issues.

26. Where implementation barriers are identified that require industry sector adjustments, sectoral time frames for compliance should be immediately established and subject to third party review.

27. All opportunities to improve current commitments (for example, shorter time frames, or more stringent standards) should be vigorously pursued.

28. A stringent ozone Annex should be reached with the United States as soon as possible.

Chapter 6: Toxic Substances

29. Environment Canada should clarify what it means by “cost effective measures” when applying the precautionary principle and ensure that “cost effective” comprehensively accounts for human health costs, particularly for children, affected by exposure to toxic substances.

30. Environment Canada should commit to take regulatory action on all substances found to be toxic under the *Canadian Environmental Protection Act* and employ processes such as the Strategic Options Process as a means to consult stakeholders on those regulatory initiatives.

31. Environment Canada should exercise its discretion under the *Canadian Environmental Protection Act* to require pollution prevention planning for all “CEPA-toxic”substances up to and including establishing timetables for phase-down and phase-out of inherently toxic substances.

32. Resources and efforts should be applied to in-depth focussed research on the effects of toxic substances on vulnerable populations, particularly children. This focussed research should directly inform the assessment processes within *CEPA* as well as in Ontario processes.

33. Criteria should be established to identify as “*CEPA* toxic” or “*CEPA* –equivalent” those substances not currently subject to *CEPA* to ensure they are made subject to the Toxic Substances Management Policy.

34. The ARET (Accelerated Reduction/Elimination of Toxics) program should not be renewed until an in-depth, impartial assessment is undertaken. Unless that assessment reveals unequivocal evidence of sustainable and

actual progress, toxic substances should not be dealt with through voluntary measures but through regulatory measures.

35. The Canada-Wide Standards process under the Environmental Harmonization Accord Standard-Setting Sub-Agreement should be repealed with respect to toxic substances.

36. The federal government should take a leadership role in the negotiation of the proposed Legally Binding Treaty on Persistent Organic Pollutants. In particular, Canada should support language in the treaty that calls for the elimination of both products (such as pesticides) and by-products (such as dioxins) in the proposed treaty as opposed to a mere reduction regime supported by some countries.

37. The province of Ontario should re-vitalize its list of candidate substances to be phased out or restricted, and this list should be developed using the precautionary principle.

38. The province of Ontario should enhance its policy and legal framework for pollution prevention.

Chapter 7: Consumer Products

39. The *Hazardous Products Act* should be amended to provide Health Canada with the power to issue mandatory consumer product recalls.

40. Health Canada should develop a proactive Materials Use Policy that incorporates a precautionary and preventative approach to avoiding the use of toxic substances in consumer products.

41. An area for further research beyond the scope of the present study should include a review of the child-specific *Hazardous Products Act* regulations reviewed herein to determine whether they were developed in a precautionary manner or in reaction to identified hazardous or lethal situations.

42. Further research is necessary to investigate the impact of international trade agreements on both the ability and inclination of Canadian regulatory agencies to set child-protective domestic regulations.

Case Study #1: Standard Setting for Lead – The Cautionary Tale

43. There is a need for routine provision of audience-appropriate educational materials about lead to health care professionals, social workers, teachers, parents, caregivers of children, women of child-bearing age and pregnant women. Such educational materials need to provide information about the multiple exposure sources and pathways (historical and current), the multiple risk factors for children, the health effects of low-level lead exposure, the means of avoiding exposure, and nutritional factors that can reduce uptake of lead.

44. There should be ongoing education of clinical health professionals, including family physicians, pediatricians, nurse practitioners and midwives, regarding clinical issues of low level lead exposure including taking an exposure history to detect sources of exposure and health effects.

45. All risk assessments conducted by Health Canada for consumer products should be subject to rigorous external peer review.

46. Health Canada should immediately adopt the lead in paint standard of 600 parts per million adopted in the United States 24 years ago. This regulation must be applied to all paints.

47. The *Hazardous Products Act* requires amendment to provide for the power to recall products. It also requires amendment to eliminate all reference in the Act or its regulations to the dubiously useful and unsupportable notion of allowing hazardous or toxic exposure so long as it does not occur in areas "frequented by children."

48. Health Canada's stated commitment to regulate the lead content of consumer products such that there be no intentional addition of lead to children's products is long overdue and should be implemented immediately.

49. As part of developing a Materials Use Policy that incorporates a precautionary and preventative approach to avoiding the use of persistent pollutants, Health Canada should mandate the phase-down and phase-out of lead in all consumer products with the exception of a very few controlled and currently non-replaceable uses such as X-ray shielding and lead-acid batteries.

Case Study #2: Regulating Pesticides to Protect Children's Health

50. The *Pest Control Product Act*'s core test for judging the acceptability of a pesticide (unacceptable risk of harm) should be specifically defined so that it can be applied in a transparent and consistent manner throughout the risk assessment-risk management process. An essential amendment to the Act, to complement Recommendation 5 below, is to designate persistent and bioaccumulative substances as presenting an unacceptable risk of harm.

51. The *Pest Control Products Act* should be amended to include a requirement to act in a precautionary manner, for example, when the weight of evidence points to the potential for "unacceptable risk of harm." In keeping with this approach, Canada should follow Sweden's lead with legislative amendments to specify inherent characteristics of pesticides that justify de- registration including criteria such as very high acute toxicity, endocrine disruption, probable human carcinogenicity, and neurotoxicity all of which should be considered synonymous with "unacceptable risk of harm."

52. The Pest Management Regulatory Agency (PMRA) should fulfill its commitment to incorporate the Toxic Substances Management Policy (TSMP) in pesticide regulation. This activity should include immediate bans (or de-registrations) on pesticides which are persistent and bioaccumulative (Track 1 substances) without wasting time and resources on re- evaluation. In keeping with this approach, the PMRA should immediately revise its TSMP Implementation Policy to eliminate the ability to register Track 1 pesticides and to cancel registration of pesticides contaminated with persistent organic pollutants pursuant to the TSMP.

53. Several toxicity tests that are currently conditionally-required should become standard requirements. This includes developmental neurotoxicity testing on young animals, which is particularly important for gauging risks to children's health. Similarly, tests for endocrine disruption that are protective of children should be made a standard PMRA test requirement.

54. The PMRA should consider the potential effects on human health of occupational/bystander and food/drinking water exposures on an aggregated basis.

55. The PMRA should consider the potential effects on human health of cumulative exposures to pesticides that act via common mechanisms of toxicity.

56. The PMRA should adopt a requirement similar to that found in the U.S. *Food Quality Protection Act*, mandating the application of an uncertainty factor with a minimum value of 10 in order to account for potential pre- and post-natal developmental toxicity and the incompleteness of toxicity and exposure data for children. The uncertainty factor could have a higher value in situations of relatively high uncertainty regarding toxicity and children's exposure.

57. The PMRA should expeditiously complete on-going re-evaluations including several that were initiated close to 20 years ago, such as for pentachlorophenol.

58. The PMRA should expeditiously fulfill its commitment and complete development of its policy on formulants. The PMRA should release its policy to the public for comment and revision. Once completed, the PMRA should effectively implement and enforce its policy. The policy should set out how the PMRA will use the EPA formulant classification system and toxicological database. The policy should also include an explicit enumeration of rigorous testing requirements for new and non-EPA-listed formulants. These requirements should be effectively enforced.

59. The PMRA should develop a pesticide reduction policy and should apply its policy to all PMRA decisions and activities including as a first priority the reduction of pesticides important in children's diets and in use categories of most relevance to children's exposure circumstances including parks and institutional facilities geared primarily to children.

60. The PMRA should ensure that the public has access to basic information that is essential to an understanding of the risks posed by pesticide exposure. Information availability requires that:

    a) The PMRA disclose all pest control product ingredients and provide access to all information upon which registration and other regulatory decisions are based;
    b) If necessary, the public health and environmental protection provisions in the *Access to Information Act* be invoke; and
    c) Public notification mechanisms regarding the initiation and status of new regulatory decisions be developed.

61. The federal government should fulfill its commitment and legislate an adverse effects reporting requirement that explicitly includes information regarding the adverse effects of pesticide exposure on children. To be effective this reporting system requires first that:

    a) effort is placed on ensuring the education of primary care health-care practitioners (i.e., family physicians, pediatricians, emergency room physicians, obstetricians and midwives, nurse practitioners and social workers about the health effects, both acute and chronic, of pesticides on children in order that they can better clinically detect these cases; and
    b) a central registry be established, federal or provincial, of adverse clinical responses to pesticides, in an attempt to gather appropriate data.

62. In recognition of the greater exposure and sensitivity in children to the toxic effects of pesticides, the federal government's National Children's Forum must allocate the necessary resources to honour longstanding domestic and international commitments to improving legal and policy tools, including application of the precautionary principle, to protect children from toxic substances, including pesticides.