

DRAFT REPORT *'Taking Stock: A Special Report on Toxic Chemicals and Children's Health in North America'*

Canadian Input – June 2004

A. Feedback on the Process for Developing the Report

Canada has several concerns with the process that was followed by the CEC Secretariat in drafting and reviewing the above mentioned report on children's health in North America. Canada is hopeful that the expert review meeting and resulting report will help highlight and resolve many of our concerns related to the content of the Report. While Canada supports the efforts of the CEC to address environmental factors that can adversely affect children's health, Canada would like the CEC to adopt a more rigorous approach.

Without subjecting documents such as the Toxic Chemicals and Children's Health Report to independent, scientific peer review prior to its distribution to the public, the CEC jeopardizes its ability to make credible and meaningful recommendations regarding the protection of children's environmental health. Moreover, release of the document in a draft for public comment in the absence of such a review risks sending misleading messages to North Americans regarding the risks to child health and the measures that should be taken to avoid those risks.

We suggest that the CEC develop appropriate guidelines in which to undertake future reports of this nature. These guidelines should address the following key areas:

- Standards related to the use of the scientific information
- Systematic and balanced engagement of the business community, academics and indigenous groups, NGOs and other stakeholders.
- Standards related to the consultation process.
- Methodologies for analysis of information to provide appropriate context and value.
- Steps for scientific peer reviews.
- Indication of whose views a report represents: authors must be acknowledged and parties covered within disclaimers must be specifically identified.
- Authors of a report should not be permitted to submit comments as a member of the public.

B. Methodology for the Analysis of the PRTR Data

Canada has concerns related to the methodology used to analyse PRTR data, particularly in Chapter 3 of the Report.

Chemical Lists

In the absence of authoritative, scientifically peer-reviewed lists of substances of concern to children's health, it is important to exercise caution in identifying these chemicals. The identification of chemicals as neurotoxicants and developmental toxicants in the report is not scientifically grounded. The scorecard provided by the Environmental Defense has not been subject to an independent peer review and for some substances does not reflect current science. It is inappropriate to use a listing that has not been subjected to the scientific discipline and rigour of a scientific authority and as such undermines the credibility of the report. The CEC Secretariat should validate the list of substances used for the neurotoxicant and developmental toxicant grouping by a recognized scientific authority.

Limitations of the PRTR data

The PRTR data represents estimated releases of environmental contaminants. It does not represent human exposure to these substances. Thus the ability of the PRTR data to accomplish the Report's objective of identifying chemicals that are most likely to be of concern to children's health is very limited, may be more misleading than helpful in stimulating appropriate action, and needs to be closely examined in the expert review process.

C. Detailed Comments on the Draft Report

Acknowledgments

The list of contributors/authors should be reinstated in the report so that it is clear who produced it and who is accountable for its content.

This is consistent with the TRAC report, which identifies the lack of author identification in CEC reports as a serious shortcoming to 'producing policy-relevant environmental information.'

Further clarification should be provided with regards to the disclaimer for this report. As currently drafted, questions arise as to whose views the Report reflects. If the Report reflects the views of a part of the CEC then this should be so identified.

Executive Summary

p.vi

The report acknowledges that PRTRs are databases whose intent is to identify levels of chemicals being released to the environment and that they do not reflect exposures to the public.

p.x

The report also states that “our lack of knowledge about the risks posed by toxic chemicals makes it difficult to quantify the extent to which environmental contaminants may contribute to many of the leading causes of illness, hospitalization and death of children”.

These statements are not supported by the tone of the remainder of the Report. It is apparent that the intent of the CEC report is to connect children’s health issues with the volume of chemical releases. The messages that children’s health is (1) the net result of the interaction of many items including: economic, social, biological and environmental factors; and that (2) the risk to children's health from environmental contaminants is not directly proportional to industrial releases need to be more strongly stated throughout the Report as they are key considerations.

Among the factors that can influence an individual's exposure to a substance and ultimately the dose to the target tissue include the route of exposure, the rate of uptake of the substance, the age, gender, ethnicity, nutritional status, pregnancy status, disease status and overall health of the individual, the duration of exposure, the frequency of exposure, the relevance of the associated toxicological endpoint of concern, etc.

Chapter 1 - Children in North America

p.8

The report should state that:

“In general, Canadian children are healthy. Over the past twenty years, life expectancy at birth has been increasing while perinatal, neonatal and infant mortality rates are all decreasing. Immunization rates for Canadian children remain among the best in the world. The proportion of children living in poverty, and the number of children born to teenage mothers are all declining.”

**Chapter 2 - Toxic Chemicals and Children’s Health in North America
Introduction**

p. 13

Pesticides, second paragraph

It is essential that children eat fruits and vegetables, especially with obesity on the rise and other health benefits. To avoid sending a public health message to the contrary, the following sentences should be added.

“Because children eat more fruits and vegetables per kilogram of body weight and because their bodies are developing, children can be especially vulnerable to the health effects of pesticides. That being said, in Canada, the vast majority of all samples in routine monitoring of domestic and imported fruits and vegetables contained no measurable residues. Less than 1% of domestic and less than 3% of imported fruits and vegetables contained residues in excess of the maximum residue limit

(MRL), which is a violation of the Food and Drugs Act. It is widely recommended that children eat a wide variety of fruits and vegetables, and it is important to wash all fruits and vegetables before consumption to reduce risk of food borne illness, pesticide residues, and bacterial and viral pathogens.”

p. 14

The Report improperly describes one of the results of this screening process. The statement concerning option two that: “can be considered toxic and placed on the Priority Substance List for further assessment” is not correct.

It should say: “one of three outcomes: the chemical can be considered not toxic to human health or the environment; placed on the Priority Substance List for further assessment or declared toxic and placed on Schedule 1 for regulatory or other action.”

The words “can be considered toxic” should be removed. If they require further assessment it is because it is not clear whether they are toxic.

PATHWAYS OF CHEMICALS

p. 16

Fourth Paragraph

A focus on children's health has prompted the growing awareness of the vulnerabilities of children *in utero*. Chemical exposures at this time can have significant, life-long and irreversible effects. For example, even low-level lead exposure during early childhood can cause measurable reductions in children's cognitive function.

Remove the reference to methylmercury.

[women eating fish contaminated with methylmercury can damage the brains of their developing children.] There is limited and inconsistent evidence for cognitive deficits from methylmercury in marine fish – the two major birth cohort studies in the Faroe Islands and the Seychelles Islands produced conflicting results.

p.16

Fifth paragraph

The CEC Secretariat had indicated that the following change was going to be incorporated:

A reference should be provided for the following sentence: "Through breast milk, babies can consume the maximum recommended lifetime dose of dioxin and five times the adult allowable daily PCB intake."

HEALTH EFFECTS OF CHEMICALS

p.17

Fourth paragraph

The following changes are needed for accuracy with the original research. The last sentence (mercury uptake in plants) should be deleted as it is not relevant to the subject of the paragraph.

"Mixtures of chemicals can have different health and environmental effects than the effects of individual chemicals. Some mixtures of chemicals can have effects that are greater than the individual chemical effect. In one study, low doses of a PCB compound (PCB 153) or dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD]) alone did not cause elevated liver porphyrin levels but animals simultaneously exposed to both compounds had liver porphyrin levels several hundred-fold control levels. (Van Birgelen *et al.* 1996). Alternatively, chemical mixtures can have less than individual chemical effects. ~~High levels of selenium may reduce the uptake of mercury in plants (Siegel *et al.* 1991).~~"

Fifth paragraph

The following changes are required for accuracy and the CEC Secretariat had indicated that these changes were going to be incorporated.

"This observation of differing health effects of chemical mixtures poses real difficulties for toxicity testing and regulation, which often rely on chemical-by-chemical testing. This approach does not reflect the reality for children, who are exposed to a mixture of chemicals throughout their day. Our understanding of the effects of long-term, multiple, simultaneous, ~~intergenerational~~ multigenerational exposures to low-level chemicals is just beginning. Creating a testing, standard setting and regulatory framework that reflects "real life" exposures is one of our next great challenges (Bucher and Lucier 1998). In the past, regulations have sought to identify a "threshold" below which a chemical does not cause health effects. For many chemicals, such a threshold may not exist. For example, on a theoretical basis, for directly genotoxic carcinogens, each decrement of exposure down to zero conveys some level of health risk. For other chemicals, a threshold may exist in certain situations."

CANCER

Third paragraph

There is conflicting evidence about cancer incidence trends in children as a result the following sentence should be modified to read:

“There is conflicting evidence about cancer incidence rates trends in children are increasing.”

Seventh paragraph

The risk associated with children’s exposure to pesticides is not accurately characterized. There is limited but not conclusive evidence on the role of exposure to pesticides and increased risk of some childhood cancers. The following sentence should be modified to read:

“There is limited but not conclusive evidence on the role of exposure to pesticides and increased risk of some childhood cancers. (Source: Zahm SH, Ward MH. 1998. Pesticides and childhood cancer. Environ Health Perspect 106 Suppl 3:893-908.)

~~Evidence is accumulating that as~~ As children's exposure to pesticides, such as home, lawn and garden pesticides increases, children may have an increased risk of non-Hodgkin's lymphoma and brain cancer (Leiss and Savitz 1995) and leukemia (Buckley et al. 2000).

LEARNING, DEVELOPMENTAL AND BEHAVIOURAL DISABILITIES

First paragraph

The terms learning and behavioural are types of disabilities. Developmental is not a type of disability, it is one possible cause of disabilities. As a result, the title should be modified as above and the text should be modified to read:

“Another childhood health issue is ~~developmental~~, learning and behavioural disabilities.”

The following is recommended for accuracy.

“These disabilities are the result of many complex interactions of genetic, social, biologic and environmental factors that interfere with fetal or early child development, ~~often during a critical time in a child's development.~~”

Fourth paragraph

A caveat should be added to reflect the fact that the causes of autism are poorly understood. The following sentence should be added:

“In the US, Ritalin has been prescribed to approximately 1.5 million children to control attention deficit hyperactivity disorder (ADHD). The number of US children taking this drug has doubled every four to seven years in the US since

1971. ADHD is estimated to affect three to six percent of all school children, with some evidence to suggest rates as high as 17 percent in the US (CDC 2003a). Even if these increases reflect diagnostic trends, ADHD is a common condition and its causes are poorly understood."

Fifth paragraph

The text should reflect the uncertainty related to the relationship between environmental factors and autism. The following sentence should be added:

"As many as 2 per 1000 US children may suffer from autism. California's autism rates increased nearly 2.5-fold between 1987 and 1994. It is not yet known whether this increase is "real" or due to changes in diagnosis (Croen *et al.* 2002). The potential role of environmental factors in autism is unknown and largely unexplored."

ENDOCRINE TOXICITY

Second paragraph

The following should be added for accuracy, the CEC Secretariat had previously indicated that these changes were going to be incorporated.

"Chemicals such as PCBs, pentachlorophenol, DDT, nonylphenol, Atrazine, and dioxins and furans are thought to have endocrine disrupting properties in experimental animals and wildlife (Environment Canada 2002b). In wildlife, altered sex ratios, thinning eggs, and reduced immune and reproductive function have been observed linked to persistent organochlorine contaminants (Vos *et al.* -2000, Guillette and Gunderson 2001)."

ASTHMA

Third paragraph

Addition of the following sentence is suggested to emphasize the link between air pollutants and asthma:

"Outdoor air pollutants such as ozone, particulates, sulfates and nitrogen oxides and indoor air pollutants such as tobacco smoke and animal/insect antigens may aggravate asthma symptoms, resulting in a range of effects from wheezing, to staying home from school, to visiting the doctor or emergency room. Some of these exposures may even contribute to the cause of asthma."

Chapter 3 - Releases of Chemicals: Data from Industrial Pollutant Release and Transfer Registers

On a policy note the Government of Canada is committed to pollution prevention and is taking action by integrating pollution prevention into laws, policies and

programs; working with industry and businesses to find ways to prevent the creation of pollution from their operations; and educating the public on the roles they play in pollution prevention. Given the policy direction of the government of Canada in terms of pollution prevention it is important that the Report recognize the efforts made in terms of recycling and energy recovery.

Despite the importance of off site transfers for recycling and for energy recovery the Report for the most part downplays these numbers. Specifically, with regards to regional and industrial facility analysis by health effect, the report does not identify the level of off site transfers for recycling. Instead the Report only provides detailed breakdowns of both on and off site releases. As is clearly seen from the chart provided on page 26 of the report, transfers for recycling and transfers for energy recovery are significant values representing over 42% of the total volume of on and off site releases and transfers in 2000. The report should recognize the efforts made in terms of recycling and energy recovery. A failure to disclose the levels of these activities within the context of an overall PRTR figure is misleading.

In terms of off-site release figures, the report does not dedicate sufficient efforts to identifying the level of activity with regards to metals sent to treatment and energy recovery at the regional and industrial facility level. Although these activities have a far smaller effect of the absolute level of PRTR figures they do again represent activities that provide opportunities for environmental benefits.

With regard to on and off site releases the Report identifies lists of particular facilities and their respective ranking in a North American context. In order to conduct a robust and meaningful analysis, the report should avoid static views of these facilities performances. Where possible, the Report should identify the facilities trend performance and ensure that information is provided in the proper context.

The report down plays or omits trends with regards to releases and transfers of specific substances to various media and the general reduction of the volume of carcinogens, neurotoxicants, and developmental toxicants.

As noted by the CEC Secretariat, the revised report will include 2002 data. For analysis purposes current data are preferable to historical information. Due to the dynamic nature of the NPRI and TRI this will necessitate that sufficient explanation be provided to identify changes in emission levels and substance coverage. Environment Canada, specifically the NPRI, in its capacity as custodian of the Canadian PRTR, should be tasked with the provision of direction with regards to the use of 2002 data. The inclusion of these data will necessitate the need for the modification of supporting text within the report.

p.23

Page 23 describes the consideration to be taken into account in order to make good use of PRTR data, knowing the limitations of PRTR data. On that page it

would be appropriate to better describe where PRTR data fits in the human exposure/pathway model. Specifically: **the release of a substance from an industrial source does not automatically lead to human exposure.**

Moreover, the degree of human exposure is not necessarily proportionate to the number of tonnes released. There are many factors to consider in determining human exposure to individual environmental toxicants, including: the route of exposure; the duration and frequency of the exposure; the rate of uptake of the substance; individual age, gender, ethnicity; and the disease, overall health, nutritional and pregnancy status of the individual. When it comes to examining human exposure to groups of environmental contaminants, the degree of human exposure cannot be aggregated in a corresponding manner to the aggregation in tonnage of industrial releases of a group of environmental toxicants (e.g., carcinogens). This is because, for example, a specific amount of one carcinogen does not necessarily have the same toxicity as the same amount as another carcinogen, nor does it necessarily have the same mechanism of exposure, meaning that the risks to human health could be considerably different across groups of carcinogens.

The report should include contextual information related to (1) the role of PRTR data in the contamination of food, air, water, soil and routes and pathways of exposure of children; (2) how other risks (besides chemical releases) contribute to the leading causes of illness, hospitalization and death of children.

p.26

As indicated on the chart provided on page 26 of the report, transfers for recycling and transfers for energy recovery are significant values representing over 42% of the total volume of on and off site releases and transfers in 2000. A failure to identify efforts in these areas within the context of a total PRTR value is problematic.

Within the report, there are several tables that identify the industrial facilities with the largest releases of known or suspected: carcinogens, developmental toxicants, and neurotoxicants. It would appear that the tact taken in the recent iteration of the Report is to list the top 25 facilities for the carcinogens and neurotoxicants categories. In order to maintain consistency with the other listings only the top 25 North American emitters should be identified for the developmental toxicants category. As such the listing of Celanese Canada, should be removed. Data indicates that this firm is not within the top 25 emitters of developmental toxicants.

p.24 Health Effects Approach

The chemicals considered as known or suspected carcinogens and used in this analysis are based on lists from the International Agency for Research on Cancer. The chemicals considered to be developmental toxicants and neurotoxicants were compiled by the nongovernmental group Environmental Defence.

p.27 Chemicals Lists

The strengths and weaknesses of the listings used in the Report need to be more fully explained. In addition, the Report should describe in more detail how the lists of chemicals used in the Report have been generated, including what kind of peer-review process, if any, they have been subjected to. With respect to the IARC list, the text of the preamble prepared by the IARC should be used as a starting point, particular in that it urges caution with respect to the use of the lists. The preamble is located at <http://monographs.iarc.fr/monoeval/preamble.html>

p.37 Table 7

The report's conclusions need to be weighed more carefully in terms of the potential public health message and risk communication.

One example is in identifying copper and zinc as the two developmental toxicants released in the highest quantities in North America. Negative developmental effects have been identified in relation to copper and zinc nutritional deficiencies in these two essential nutrients, particularly in pregnant mothers.

Language should be inserted in the report to ensure the appropriate public health message remains, which is that pregnant mothers and young children must have sufficient levels of copper in zinc in their diets to avoid developmental deficiencies.

p.63 Protecting Arctic Children

The following sentence should be added in the case study to recognize the nutritional benefits and spiritual importance of traditional foods to Northern aboriginal people:

“Although the consumption of traditional foods containing contaminants may be associated with greater exposures and health risks, it is important to recognize that diets containing these foods confer substantial nutritional benefits and are the foundation of the social, cultural and spiritual way of life for Canada's Aboriginal Peoples.”

Chapter 4 - What's Being Done to Protect Children's Health from Toxic Chemicals?

Specific reference to CEPA should be included in this section of the document. The *Canadian Environmental Protection Act, 1999* (CEPA) gives the government the authority to take action to protect the environment and the health of the Canadian public from risks associated with pollution, dangerous substances, and products of biotechnology. Human health risk assessments conducted under CEPA estimate exposures specific for children of various age groups, and examine potential health hazards (e.g. cancer, reproductive and development effects) that may be especially important to this group.

Chapter 5 - What Needs to be done to Protect Children's Health from Toxic Chemicals

Harmonization of different calculation processes of multimedia quality criteria and standard values and health risk assessment in North-America must be cited as a recommendation in Chapter 5, including these two priority steps:

- First, exposure factors specific to children must be taken into account for air, tapwater and soil quality criteria and standard calculations as well as health risk assessment. In this context, revision of actual quality criteria and standard values constitute an essential preliminary step.
- Secondly, it is essential to verify if newborns and children up to 12 years of age inhale and ingest more toxic chemicals than the associated reference dose, when multimedia concentration reaches the resulting air, soil quality criteria and tapwater standard values.
- On page 72 the report indicates that "more of our children have asthma, brain cancers and certain types of leukemia than ever before, more of our children seem to be born with certain birth defects, many more of our children seem to be struggling with a learning disability". As previously mentioned, there is conflicting evidence on cancer incidence trends in children, cancer incidence rates have been stable over the last 20 years for most cancers. The incidence of birth defects is either stable or declining in Canada and there is not enough information on learning disabilities to be able to state with confidence that their prevalence is increasing. We suggest that this be included in the report.

References

- Page 77 the website for Health Canada is incorrect - children's health and the environment information is located at <http://www.hc-sc.gc.ca/hecs-sesc/oceh/index.htm>.