



**Prenatal Environmental Health Education
(PEHE) Forum**

FINAL REPORT

November 20th-21st, 2014

University of Ottawa

Acknowledgements:

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Introduction:

The Prenatal Environmental Health Education (PEHE) Forum took place at the University of Ottawa on November 20th and 21st, 2014. Participants of this highly collaborative and multidisciplinary event included over 100 experts in prenatal care (obstetricians, family physicians, midwives, nurses and doulas), environmental medicine, public health, environmental health research (social scientists, toxicologists, epidemiologists), policy and education. Also represented were medical residents and graduate students from a range of health and environment related disciplines.

The two day event consisted of presentations and moderated discussions covering themes including: evidence linking prenatal exposures to negative health outcomes; environmental health inequities; PEHE resources; U.S. experiences in incorporating PEHE into clinical practice; and, opportunities and barriers to better integrating PEHE into the Canadian health care context. Break-out sessions and discussions were used to draw on the considerable and diverse experience of participants to develop and prioritize recommendations for improving prenatal environmental health education. This report provides background to the Forum and summarizes the key observations and recommendations that emerged.

For further information about the PEHE Forum including the program, key resource materials as well as slides and videos of presentations, please go to: <http://pehe-forum.com/>

Background:

The World Health Organization estimates that environmental factors are responsible for 13% of Canada's disease burden [1] and according to a 2008 study, up to 25,000 deaths and \$9 billion in health care costs in Canada are associated with adverse environmental exposures [2]. Toxic substances of particular concern, including lead, mercury, pesticides, phthalates, bisphenol A (BPA) and flame retardants, are found in the air, water and food we consume, and in countless household items, such as cosmetics, cleaning products, plastics and furnishings [3]. Canadians are commonly exposed to dozens of these contaminants [4]. The dynamic and complex processes that occur as the brain and other organ systems develop make the developing foetus and child particularly susceptible as compared to adults [4]. Pregnancy is often the most vulnerable time, as day-to-day prenatal exposures, even at extremely low doses, have been shown to alter brain development affecting IQ and contribute to such disorders as ADHD [5]. There is also considerable evidence linking prenatal exposures to obesity and diabetes, allergy and asthma and various cancers [3, 6-8].

The most effective and equitable approach to reducing exposures to toxic substance is through regulations that prevent the release of known and suspected toxic substances into the environment. Requiring industry to demonstrate that chemicals are non-toxic to the developing foetus before they are introduced into the market is an obvious way to do this. Currently the burden of proof typically falls on the government via a time-intensive, chemical-by-chemical process. Given that chemicals with known and suspected toxicity continue to be in widespread use, it is critical that individuals be educated about protective actions that they can take to reduce exposures. Examples of protective actions include using non-toxic cleaning products and cosmetics, being selective about the types of fish and other foods consumed, and even limiting certain outdoor activities on high smog days. While costs may present barriers to taking some actions (e.g. eating organic), many cost little or nothing (e.g. not microwaving plastics or wet mopping in the home to reduce dust, an important source of contaminant exposure for children). One of the biggest barriers to taking action is a lack of awareness of potential risks and knowledge of practical ways to reduce them. While numerous organizations are working to develop educational materials to educate the public about these issues (e.g., <http://www.healthyenvironmentforkids.ca/>), prospective parents are not receiving the information that they need [9-11]. This is illustrated in the results of a recent survey of new mothers in Ontario which showed that almost 50% of respondents reported having received no information about environmental health risks to their children since getting pregnant [10].

Prenatal health care providers including obstetricians, midwives, nurses and family physicians are in a particularly good position to educate prospective parents about ways to reduce exposures prior to conception and during pregnancy, due to their early and regular contact and the professional authority they hold. Most practitioners however, do not routinely address these issues with their patients. For example, from the Ontario survey discussed above, less than 8% of new mothers reported having received any environmental health-related information from their prenatal care provider [10]. A national U.S. survey found that while obstetricians and

gynecologists commonly discuss risks associated with smoking, diet and alcohol consumption with their pregnant patients, rare are discussions about pesticides, phthalates, BPA, volatile organic compounds (VOCs) or even lead, mercury or second hand smoke [11]. The researchers suggest that this is a reflection both of the limited training on the topic of environmental health and of the absence of reliable, evidence based reference materials.

Internationally, there are calls to increase efforts regarding environmental health education [12-16]. For example, the American College of Obstetricians and Gynecologists and the American Society for Reproductive Medicine state that “the evidence that links exposure to toxic environmental agents and adverse reproductive and developmental health outcomes is sufficiently robust for timely action to identify and reduce exposure to toxic environmental agents while addressing the consequences of such exposure”[13, p.931]. A 2013 report from the Royal College of Obstetricians and Gynecologists in the UK makes a similar recommendation [13]. Canada is lagging behind in acknowledging the importance of prenatal environmental health exposures, and within the health care setting very little environmental health education is being done. The PEHE Forum was held as an initial step towards the development of strategies to address this problem.

PEHE Forum Objectives:

With the ultimate goal of reducing early exposures and improving children’s health, the PEHE Forum brought together a diverse group of experts to:

- Share knowledge around priority environmental health issues, education practices, opportunities and barriers, and existing educational resources; and,
- Create a dialogue, identify common interests and goals, and build partnerships associated with environmental health education at the prenatal care level.

Participants:

Coming from across Canada and the U.S., over 100 experts in prenatal care (obstetrics, family medicine, midwifery and nursing), environmental medicine, public health, environmental health research, policy and education participated in the event. Numerous graduate students and medical residents were also involved. The purpose of targeting such a diverse group was to facilitate multidisciplinary partnerships that would lead to the sharing of ideas, expertise and resources, in addition to creating a common voice with the potential for greater influence. Considerable effort went into ensuring the diversity of individuals, organizations and populations at the Forum. These efforts included targeted publicity (professional associations, government departments, hospitals, university faculties and NGOs), presentations in a variety of contexts, personal invitations and media releases.

The effort paid off, as more than a dozen universities and an extended list of list of governmental, non-governmental, health care, environmental and other organizations were represented at the Forum. These include:

The Society of Obstetricians and Gynaecologists of Canada	The Centre for Environmental Health Equity
Children's Hospital of Eastern Ontario (CHEO)	Environmental Health Institute of Canada
Canadian Partnership for Children's Health and Environment	International Society for Children's Health and the Environment
New Brunswick Lung Association	Canadian Association of Midwives
College of Family Physicians of Canada	The Sandbox Project
National Aboriginal Council of Midwives	Child & Family Research Institute
Registered Nurses' Association of Ontario (RNAO)	David Suzuki Foundation
Toronto Public Health	Provincial Council for Maternal and Child Health
Region of Waterloo Public Health	BORN Ontario
Université du Québec à Montréal	University of Toronto
Public Health Agency of Canada	The Union of Ontario Indians
National Collaborating Centre for Determinants of Health	Provincial Council for Maternal and Child Health
First Environment Collaborative	The First 6 Years
Northern Health, British Columbia	Environmental Health Clinic, Women's College Hospital
Health Canada	University of Ontario Institute of Technology
Learning Disabilities Association of Canada	Kingston General Hospital
Simon Fraser University	Carleton University
AllerGen	Institute of Population Health, University of Ottawa
Université de Sherbrooke	Ottawa Health Research Institute
Department of Obstetrics and Gynecology, Queens U	Program in Reproductive Health and the Environment, UCSF
Ontario College of Family Physicians	Dawson College, Montreal
Hospital for Sick Kids	South Riverdale Community Health Centre
Saskatchewan Prevention Institute	University of Waterloo
College of Family Physicians of Canada	Canadian Paediatric Society

Presentations and Discussions:

To ensure that all participants' voices would be heard, presentations and panel sessions were kept short, leaving adequate time for discussion and debate. The last half day was dedicated to break-out group discussions and an activity aimed at eliciting recommendations for moving forward.

Day 1:

The Forum began with an opening welcome from the Forum organiser, Dr. Eric Crighton, and introductory remarks from Dr. Jennifer Blake, the CEO of the Society for Obstetricians and Gynecologists of Canada. This was followed by keynote presentations on evidence linking contaminate exposures and prenatal health outcomes.

- Dr. Bruce Lanphear, a Clinician Scientist with the Child and Family Research Institute and Simon Fraser University presented compelling evidence linking low-level exposures to lead, mercury, pesticides and other toxic substances to lasting and irreversible impacts on the developing brain. Dr. Lanphear launched his new video “Little Things Matter: The Impact of Toxins on the Developing Brain” on the same topic. The video can be accessed [here](#).
- Dr. Karen Phillips, an Associate Professor in the School of Interdisciplinary Health Studies at the University of Ottawa presented on the science and evidence linking foetal exposures to endocrine disrupting chemicals with various adverse and often lifelong health outcomes.

These presentations spurred considerable discussion about where efforts should be focused to reduce exposures. There was strong support voiced for legislative change, forcing industry to demonstrate that a chemical is not harmful to the developing foetus before being released onto the market. The responsibility for taking protective actions should not fall on prospective parents, but in the absence of legislative change, education is needed.

The first panel session focused on issues of health equity in prenatal care.

- Jeff Masuda, Director of the Centre for Environmental Health Equity and Professor at Queen's University, provided an overview of the concept of (in)equity and stressed the need to address the significant injustices in society that underlie the environmental health burdens some groups face.
- Dianne Oickle, Knowledge Translation Specialist at the National Collaborating Centre for Determinants of Health, discussed equity within the context of the social determinants of health framework. She highlighted the importance of providing public health resources not in an equal way but rather in an equitable way based on people's particular needs.
- Lynda Banning, a Fetal Alcohol Spectrum Disorder (FASD) Regional Program Worker (Northern Superior) with the Union of Ontario Indians, discussed the unique health challenges which First Nation communities in Canada face.
- Jill McDowell, Community Health Officer with the Toronto Public Health approached the topic of inequity through a presentation on the lived experience of low income mothers in Toronto. In doing so, Jill advocated for inclusionary research and the need for systematic change in order to reduce inequities in this and other vulnerable populations.

This panel stimulated a passionate discussion about the need to think of health equity as a human right and the importance of political activism for addressing this issue. It was further stressed that we must focus on the root causes of environmental health inequities such as poverty, social exclusion and lack of agency if we hope to foster change.

The afternoon of Day 1 explored current efforts and resources in prenatal health education in Canada.

- Christine Brown, Health Canada's Safe Environments Directorate presented on Health Canada's Chemical Management Plan and related public outreach tools and strategies. Questions were posed to participants about how Health Canada's outreach efforts could be more effective.
- Erica Phipps, Executive Director of the Canadian Partnership for Children's Health and Environment (CPCHE), shared educational resources for parents and health care practitioners, including the 'Top 5 Tips' video describing simple and affordable actions for reducing toxic exposures in the home. This video can be accessed [here](#).
- Alan Abelsohn, with the Environmental Health Committee of the College of Family Physicians of Canada, highlighted the importance of environmental health in teaching and knowledge translation, and demonstrated that despite environmental health being complex, simple messaging is possible and is most effective.

The discussion that ensued focused on when and how prenatal health care providers can incorporate EH education into practice. Several participants mentioned that they had not been aware of any of the educational resources presented by the panelists and were happy to now have some tools that they could use in their teaching and practice. Interest was expressed in field-testing the use of the Top 5 Tips video and/or other educational resources in clinical care settings to assess and demonstrate their effectiveness.

Dr. Eric Crighton, from the University of Ottawa, finished the day with a presentation on results of a scoping review of environmental health messaging within mainstream healthy pregnancy informational resources (websites, pregnancy books etc.). Findings revealed that mainstream healthy pregnancy resources rarely address environmental health issues. It was recommended that efforts be made to integrate existing environmental health messaging into mainstream healthy pregnancy educational resources.

Day 2

The second day of the Forum focused on identifying, defining and prioritizing opportunities around integrating PEHE into prenatal care.

A presentation by Dr. Marya Zlatnik, an obstetrician affiliated with the University of California, San Francisco, discussed the integration of environmental health education into prenatal care based on the American experience. She stressed the need for a multi-pronged approach involving:

educating health care professionals, adding to the evidence base through randomized control trials and intervention studies to validate the effectiveness of PEHE in contributing to health benefits, utilising the media to raise awareness, and lobbying the government and industry for better regulations

This presentation generated considerable interest and discussion about opportunities in the Canadian context. During the discussion and question period, participants confirmed the need for, and expressed interest in working towards, building a stronger evidence base about the effectiveness and value of PEHE and improving medical training.

The final panel discussion was focused on identifying challenges and opportunities for incorporating environmental health education into clinical care settings.

- Katsi Cook, Midwife and Executive Director of the First Environment Collaborative, highlighted the importance of using social and cultural intelligence as we integrate environmental health in education and clinical care.
- Hilda Swirsky, representing the Registered Nurses Association of Ontario, discussed opportunities for education on lead during breastfeeding.
- Lynn Marshall, President of the Environmental Health Institute of Canada, focused on integrating environmental health into education and health care provider curricula. She also discussed exposure assessment tools being used by some physicians.
- Jennifer Blake, CEO of the Society for Obstetricians and Gynecologists of Canada, called for action from health care providers, and illustrated how, within the context of obstetrical care, we can begin to remove the barriers to integrating PEHE into clinical practice.

The subsequent discussion acknowledged the lack in education about prenatal environmental health, and highlighted the importance of developing socially and culturally sensitive messaging in health care. Further comments stressed the importance of combining education about individual protective actions with community and societal level action.

Based upon the knowledge and information shared during the previous two days, the afternoon of Day 2 was dedicated to having Forum participants form break-out groups to identify recommendations for improving prenatal environmental health education in Canada, followed by an interactive plenary session facilitated by Erica Phipps, CPCHE, to glean key outcomes of the group discussions. The key themes and recommended actions are included in the “Moving Forward” section below.

In closing, ‘thought leaders’ representing various health sectors (obstetrics, family medicine, public health, nursing and midwifery) summarized what they had learned from the Forum, proposed ideas for moving PEHE forward within their professional context and committed to support future initiatives. Following a closing statement from Dr. Eric Crighton the Forum was adjourned.

Moving Forward: Recommendations

From the presentations, panel sessions, discussions and break-out activities that took place over the two day event, numerous recommendations were proposed. These ranged in scope from how we should think about and approach environmental health issues to short-term actions related to raising awareness about prenatal environmental health risks. Recommendations are grouped into 3 major themes: 1) Guiding principles; 2) Key gaps and opportunities; and, 3) Short term goals.

Guiding Principles:

Many of the recommendations put forward by participants focused on ways we should think about prenatal environmental health problems and the overall approach we should take in our efforts to address them. Specifically it was recommended that we:

- Work more collaboratively and take a multidisciplinary approach by involving health care, public health, social scientists, NGOs, Government and the broader community;
- Maintain an equity perspective by considering the injustices in society that underlie the environmental health burdens we are trying to address;
- Incorporate different types of knowledge into our work including First Nations knowledge;
- Consider local contexts when developing strategies to reduce environmental exposures being sensitive to cultural, social and economic circumstances; and,
- Engage and learn from local grassroots organizations to ensure an understanding of local contexts.

Efforts should be made to integrate these recommendations into all of the work we do if we hope to see real progress in reducing prenatal environmental exposures.

Key Gaps and Opportunities:

A key objective of the PEHE Forum was to develop strategies for improving environmental health education in the prenatal care context, yet a core message we heard from participants was that education alone cannot protect pregnant women and the developing foetus from harmful exposures: the most critical need is for a more robust and preventive regulatory approach to chemicals management. On numerous occasions it was stressed that:

- We must call for legislative and regulatory change to place the burden of proof on industry that the chemicals they are producing are not harmful to the developing foetus. The most effective means to reduce exposures is to prevent known and suspected toxic substances from being released into the environment and used in consumer products in the first place.
- We must reduce inequitable EH burden by addressing the factors that create the inequity. Examples include the development of a national housing strategy, poverty reduction, a fairer tax system and improved and equal access to green space.

Given the slow pace of legislative change and limited political will to address equity issues, it was recognized that effective prenatal environmental health education is an essential part of what should be a multipronged effort, and that education can help individuals reduce their exposures while creating a more informed and empowered citizenry.

With regards to improving prenatal environmental health education, a number of core messages emerged:

- The focus of EH educational efforts must go beyond just pregnant women to include elementary students and young adults to raise awareness of EH issues that could have a significant impacts on the health of their future children and their own health over the long term. Opportunities to engage with workers exposed to toxicants in the workplace should also be examined.
- Healthcare providers, given their authority and the level of trust they hold, must be engaged to play a much more significant role in prenatal environmental health education.
- Work is needed to improve how we communicate prenatal environmental health messages:
 - Ensure that EH educational materials are clear, consistent in their messaging and are developed, distributed and/or endorsed by ‘respected’ sources (e.g. Health Canada, medical associations, etc.);
 - Work with trusted partners (e.g. Health Canada) to ‘infiltrate’ prenatal health care practices;
 - Focus educational messaging on practical solutions that are sensitive to financial, social and cultural barriers;
 - Be more opportunistic about getting the message out – e.g. waiting rooms and other points of health care system contact;
 - Engage the audience using appealing and interactive media: videos, interactive activities (e.g. ‘test your knowledge’) and podcasts; and,
 - Work with local community organizations to help connect locally.

Short term actions:

Most recommendations put forward by Forum participants focused on short- to medium-term tangible actions.

- Issue a joint position statement, based on recommendations outlined at the Forum, calling for action to reduce exposures to toxic substances in Canada and use the joint statement as an advocacy tool. The statement should be signed by all relevant medical, research, policy and advocacy organizations and published in a high profile Canadian medical journal (e.g. Journal of Obstetrics and Gynecology Canada).
- Develop a resource package that practitioners can provide to patients that includes existing (or modified) materials from reputable sources such as Health Canada, CPCHE and others. Examples include a `tear away` information page that would provide basic information and web links to additional materials, and CPCHE's `Top 5 Tips` video for waiting rooms.
- Work towards integrating environmental health into medical education at all levels. Several specific recommendations related to this were made:
 - Provide accredited continuing medical education (CME) opportunities for practitioners;
 - Find champions to push for the inclusion of environmental health in undergraduate medical school curriculum;
 - Develop a chapter for a popular medical textbook; and,
 - Add compulsory rotations in environmental health for medical students/residents
- Develop a youth environmental health literacy program endorsed by health care professionals and others focused on providing locally relevant information about EH risks and simple actions that can be taken to reduce them. To engage youth on health-environment linkages, a national video competition was proposed whereby participants would be invited to produce short videos communicating key EH messages.
- Advocate for the integration of questions related to environmental exposures into existing patient health questionnaires/records. Examples could include the Ontario Antenatal Record and the Rourke Baby Record.
- Integrate environmental health information into existing healthy pregnancy programs and educational materials. Some potential `targets` for this information were identified by participants:
 - Professional Association (e.g. Society of Obstetricians and Gynecologists of Canada, College of Family Physicians of Canada) materials;

- Government (Health Canada, Public Health Agency of Canada) websites and other materials
 - Better Outcomes Registry and Network (BORN): OMAMA project
 - Healthy Babies Healthy Children (Ontario) program
 - Public Health Units (websites, breast feeding classes, prenatal classes etc.)
 - Popular healthy pregnancy guides (e.g. *What to Expect When You're Expecting*)
- Encourage and support colleagues with expertise in prenatal environmental health to give presentations on the topic at professional medical association conferences (e.g. SOGC, CFPC, CPS etc.) to raise awareness among health care providers.
- Engage media in EH issues. This could include writing op-eds, publicizing research findings (media interviews), developing strategies to raise media interest (e.g., creation of an environmental health journalism award), produce short, compelling videos on priority topics (e.g., similar to the “Little Things Matter” video).
- Conduct a national study among prenatal care providers (obstetricians, midwives, family doctors and nurses) to examine knowledge and attitudes about prenatal environmental health issues and potential barriers and opportunities to integrating PEHE into clinical practice.
- Conduct an intervention study to determine the extent to which receiving EH information (e.g. watching the CPCHE Top 5 Tips video) leads to behavioural change.
- Convene a formal PEHE interdisciplinary working group dedicated to addressing the recommendations made at the PEHE Forum.
- Invite PEHE Forum participants and others to join and participate in activities
 - Establish a work plan
 - Create a network through which group members can communicate
- Hold a 2nd national PEHE Forum. The success of the event was perhaps most evident from a call from numerous participants to repeat the PEHE Forum exercise in two years. Recommendations for the next Forum include using a different geographic location (e.g., western Canada) so different people can attend, placing a greater focus on policy challenges/solutions, and involving additional relevant groups (e.g. nurse practitioners, fertility researchers, sexual health educators, Canadian Public Health Association (CPHA) and provincial public health associations, poverty coalitions, the National Collaborating Centre for Environmental Health and Aboriginal Head Start)

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Appendix 1:

Day 1 November 20 th	
8:30	Registration
9:00	Opening welcome: Dr. Jennifer Blake, CEO, Society for Obstetricians and Gynecologists of Canada; Introduction to the PEHE Forum: Eric Crighton, University of Ottawa
9:30	Keynote presentation: Little things matter: The impact of toxins on the developing brain Dr. Bruce Lanphear, Clinician Scientist, Child and Family Research Institute, BC Children's Hospital and Faculty of Health Sciences, Simon Fraser University.
10:45	Break
11:00	Presentation & discussion: Karen Phillips PhD, Associate Professor, School of Interdisciplinary Health Sciences. University of Ottawa. Title: The impacts of early life exposures to Endocrine Disrupting Chemicals (EDCs) .
12:00	Lunch
1:15	Panel discussion: Addressing prenatal and children's environmental health inequities in the context of socioeconomic, culture and community factors <ul style="list-style-type: none"> • Jeff Masuda, Director, Centre for Environmental Health Equity, Associate Professor, Queen's University • Jill McDowell, Community Health Officer, Urban Issues, Toronto Public Health • Diane Oickle, Knowledge Translation Specialist, National Collaborating Centre for Determinants of Health • Lynda Banning, FASD Regional Program Worker (Northern Superior), Union of Ontario Indians
2:30	Break
2:45	Panel discussion: Environmental health education in Canada: Current efforts and resources <ul style="list-style-type: none"> • Alan Abelsohn, Family Medicine, Environmental Health Committee, CFPC • Christine Brown, Safe Environments Directorate, Health Canada • Erica Phipps, Executive Director, Canadian Partnership for Children's Health and Environment (CPCHE)

4:00	Presentation: Prenatal Environmental Health Education: A scoping review (Eric Crighton)
4:15	Summary of Day 1
4:30	Reception

Day 2 November 21st	
8:30	Review of day 1 and Introduction to day 2
9:00	Keynote presentation: Keynote presentation: Integrating environmental health education into prenatal care: Learning from the U.S. experience. Dr. Marya Zlatnik, MD, MMS, Maternal Fetal Medicine, University of California, San Francisco.
10:20	Break
10:40	Panel discussion: Practices, challenges and opportunities in environmental health education in Canadian prenatal and clinical care settings <ul style="list-style-type: none"> • Katsi Cook, Midwife, Executive Director First Environment Collaborative • Jennifer Blake, CEO, Society for Obstetricians and Gynecologists of Canada • Lynn Marshall, President, Environmental Health Institute of Canada • Hilda Swirsky, RN, High Risk Obstetrics, Mount Sinai Hospital, RNAO
12:00	Lunch
1:00	Defining and prioritizing opportunities: Group brainstorming and report back; moderated discussion (Moderator: Erica Phipps)
2:30	Break
2:50	Thought leaders round-up: Key observations and recommendations from representatives of the health sector
3:30	Plenary review and refinement of key forum observations/recommendations
4:00	Meeting Adjournment