

**Margaret (Meg) E. Sears (M.Eng., Ph.D.)**  
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## **Capabilities and Experience:**

**Broad interests** include health and medicine, epidemiology and toxicology, chemistry, ecology, biology and chemical engineering. Specific interests in ongoing work include environmental health, and scientific evidence synthesis for hazard and risk assessment, and public policy. Currently my focus is on multi-factorial contributors to chronic disease, and filling data gaps in environmental health epidemiology.

**Activities** include researching, assessing, reviewing and reporting in the scientific literature, for government bodies, peer-reviewed journals, and civil society organizations. Work includes variously a broad network of scientific experts, physicians and others on topics related to environment and health. I also participate in federal government consultations and meetings on chemicals management and pesticides. In 2015, two reports from the Parliamentary Standing Committee on Health included my recommendations regarding pesticides, and health effects of radiofrequency radiation. Currently the *Canadian Environmental Protection Act* and the *Canadian Environmental Assessment Act* – Parliamentary Committee and Panel recommendations respectively include my (and others') recommendations, and legislative amendments are possible.

**Experience** working with groups of researchers on large scientific reports included research question identification, literature searches, data extraction, analysis and review, writing, editing, managing references and maintaining version control; both of my own work and of large groups'. I have also twice been a medical journal guest editor.

**Public speaking** includes lecturing at the Universities of Ottawa and Toronto, and Lakehead University, and numerous public presentations regarding topics in environmental health.

**Topics** recently addressed include hazard versus risk assessment per federal legislation, and more specifically epidemiology, toxicology (including pesticides), endocrine disruptors, toxic elements, systematic review in environmental health, and electromagnetic radiation in public and personal health. I have conducted consultations among professionals, and citizens' groups, and prepared and presented scientific committee and tribunal submissions.

**Diverse laboratory and field experience** in chemical engineering and applied chemistry, and microbiology, including occupational health and safety, and microbiological and petrochemical industry research.

## **Academic Background**

- 1986 Doctor of Philosophy, McGill University. Effects of growth conditions on biosorption by *Rhizopus* biosorbents.
- 1981 Masters of Chemical Engineering, McGill University. Measurement and mathematical modelling of biosorption of uranyl ion by biomass of the mould *Rhizopus arrhizus*.
- 1979 Bachelors of Applied Chemistry and Chemical Engineering, with Honours, University of Toronto.

## **Appointments**

Senior Clinical Research Associate, previously under Dr. David Moher at the Centre for Practice-Changing Research, Epidemiology; presently working with Dr. Richard van der Jagt at the Environmental Health Information Infrastructure, at the Ottawa Hospital Research Institute

Associate with University of Sherbrooke, working with Dr. Isabelle Gaboury and colleagues

*Previously* Adjunct Investigator at the Children's Hospital of Eastern Ontario (this type of appointment was discontinued)

**Professional Membership** Canadian Paediatric Society, including the Environmental Health Section.

Canadian Public Health Association

Ontario Public Health Association

## **Awards and Grants**

2013 Carleton Lee Award, American Academy of Environmental Medicine

2007-2009 Canadian Institutes of Health Research / Social Sciences and Humanities Research Council grant for a scoping review on the toxic elements arsenic, cadmium, lead and mercury.

1980-1985 Natural Sciences and Engineering Research Council scholarship for post-graduate studies

## **Work Experience – University instruction**

Present Sr. Clinical Research Associate at the Ottawa Hospital Research Institute, working on the Canadian Environmental Health Information Infrastructure project

2012, 2014, 2017 University of Ottawa EVS 3131 (undergraduate) and Capstone Masters programs - Supervised and participated in student projects. Lectured on Environmental Health.

2010 – 2012 Lakehead University and the Northern School of Medicine - PUBL5213 Environmental and Occupational Public Health (Masters of Public Health). Lectured on toxicology and epidemiology, land use planning, evidence synthesis, pesticides, toxic metals and endocrine disruption, in a distance-learning course.

2011, 2012 Lectured on toxicology epidemiology and evidence synthesis, as well as pesticides, in ENV 341, at University of Toronto.

2009, 2010 Lectured on toxicology, epidemiology, evidence synthesis, pesticides and toxic metals in HSS3303 at the University of Ottawa.

## **Work Experience – selected**

2018 Preparation of an Indoor Air Quality Module regarding Chemical Sensitivities, for the Canadian National Research Council.

2013-2014 – Health expert in the Proceeding of the Alberta Energy Regulator re. health effects of bitumen emissions in the Peace River area.

2012 Health expert in Fortis BC hearing re. Smart Meters

2004-on Systematic Reviews in the Centre for Practice Changing Research at the Ottawa Hospital Research Institute, under Dr. David Moher. Many aspects of evidence review and synthesis, and editorial responsibility for large medical scientific research reports.

2003-on Work with diverse medical researchers, on data analysis, presentation and writing, in Ottawa, Toronto and at the University of Sherbrooke.

- 2011 In conjunction with physicians associated with the Ontario College of Family Physicians, I conducted literature searches, synthesis of information and co-writing of a report regarding updating the Greig Record for child and adolescent primary care visits with Family Physicians. I organized and spoke at a meeting to present Toxic Metals in Canadians scoping review findings and to gain insights from physicians, clinical and toxicological researchers, and public health officials.
- 2009 Co-authored “Air Travel and Chemical Sensitivities” for the Canadian Transportation Authority.
- 2008 Canadian Institutes of Health Research Primary Investigator - “Toxic Metals in Canadians and their Environments: Exposures, health effects, and physician and public health management strategies - A Scoping Review”
- 2008-on Occasionally assist the David Suzuki Foundation with scientific review of documents regarding environmental health topics, including pesticides and cosmetics.  
Prepared affidavits with regard to health effects of herbicides (and contaminants) used at CFB Gagetown, NB.  
Lectured on epidemiology, toxicology and synthesis of scientific evidence in environmental health, pesticides, toxic elements (particularly arsenic, cadmium, lead and mercury) as well as scientific writing, in undergraduate courses at the University of Ottawa and University of Toronto, and at the graduate level (Masters of Public Health) at Lakehead University.
- 2006 Prepared “A Medical Perspective on Environmental Sensitivities” for the Canadian Human Rights Commission, including research review, and consultation with physicians, architects and civil society organizations.
- 2002-on Writing, and assisting Ottawa medical researchers and others with drafting of research documents.
- This work includes data extraction, review of data and statistics, review of the medical background information, literature review updates, and planning, drafting and version control.
  - Articles have included systematic reviews, randomized controlled trials, other interventional and observational studies, and commentaries.
  - Topics include pesticide assessment and 2,4-D, environmental sensitivities, medical ethics, medical education, diabetes in children, probiotics, sexuality and fertility following spinal cord injury, breast cancer care, child car-seats and booster-seats, nocturnal enuresis, omega-3 fatty acids and infant health, computerized physician order-entry systems in the context of bronchiolitis, childhood arthritis, models of medical practice and collaboration, lipid modifying agents, drug delivery, TPMT assessment in thiopurine therapy, morphine monitoring nursing practice, nutritional supplements and drugs for cardiovascular health, and online medical education.
- 2002 Drafted “Frequently Asked Questions” responses regarding breast milk contamination, flame retardants, West Nile virus and insect repellents, for the Canadian Institute of Child Health.
- 1979-80 Research engineer at Gulf Canada's research facility in Sheridan Pk., Mississauga.  
Constructed and operated small-scale laboratory simulation of heavy oil cracking, as well as mathematical modelling of enhanced oil recovery (akin to 4-phase hydrogeology).
- 1975-79 During summers prior to and during undergraduate studies, worked in UofT Chemical Engineering laboratories (including tar sands oil extraction), and at Imperial Oil Research laboratories.

## Volunteer Activities

- 2017 Member of the Science Committee for the Canadian Public Health Association 2018 Conference Planning Committee
- 2017 Core leadership group and 2018 Conference planning for the Canadian Alliance for Regional Risk Factor Surveillance
- 2011- on Board member (currently Chair) of *Prevent Cancer Now* ([www.preventcancer.ca](http://www.preventcancer.ca)). Responsible for writing and editing publicly available documents, media, and numerous public presentations regarding cancer prevention.
- With Dr. van der Jagt, initiating a national environmental health information infrastructure for investigation of links between environmental quality and health.
- 2011- on Member of the Sustainability Committee (“Green Team”) at the Children’s Hospital of Eastern Ontario, Ottawa.
- 2001- on Established, along with other mothers, the Ottawa Neuroblastoma Research Fund (CHEO)
- 2001- on Work with physicians and various organizations regarding pesticides and health.
- 2002- on (currently quiescent) Founding member of the Coalition for a Healthy Ottawa and the Canadian Coalition for Health and the Environment. We synthesized and promoted research on pesticides and health, as well as synthesis of scientific evidence, in efforts to reduce use of pesticides in urban areas, and for vector control, with these and other groups across Canada.
- 1995-8 Member of the Board of Directors of *Les Petits Ballets*, in charge of publicity.
- 1989-on (currently quiescent) Founding member and Secretary for the Wetlands Preservation Group of West Carleton, working for environmental protection before the Ontario Municipal Board, Environmental Assessment Advisory Committee, in court, and before the Sewell Commission on land use planning.

## Peer-reviewed publications

Fernández, C., A. A. de Salles, M. E. Sears, R. D. Morris, and D. L. Davis. “Absorption of Wireless Radiation in the Child versus Adult Brain and Eye from Cell Phone Conversation or Virtual Reality.” *Environmental Research*, June 5, 2018. <https://doi.org/10.1016/j.envres.2018.05.013>.

Sears, Margaret E. Chelation: Harnessing and Enhancing Heavy Metal Detoxification: A Review. *The Scientific World Journal* 2013 (April 18, 2013). doi:10.1155/2013/219840.

Kanji, Salmaan, Dugald Seely, Fatemeh Yazdi, Jennifer Tetzlaff, Kavita Singh, Alexander Tsertsvadze, Andrea C. Tricco, et al. “Interactions of Commonly Used Dietary Supplements with Cardiovascular Drugs: a Systematic Review.” *Systematic Reviews* 1, no. 1 (May 31, 2012): 26.

Seely D, Kanji S, Yazdi F, Tetzlaff J, Singh K, Tsertsvadze A, Sears ME, Tricco A, Ooi TC, Turek M, Tsouros S, Skidmore B, Daniel R, Ansari MT. Dietary Supplements in Adults Taking Cardiovascular Drugs. Comparative Effectiveness Review No. 51. (Prepared by the University of Ottawa Evidence-based Practice Center under Contract No. HHS 290-2007- 10059-I.) AHRQ Publication No. 12-EHC021-EF. Rockville, MD: Agency for Healthcare Research and Quality. April 2012.

Sears, Margaret E., Kathleen J. Kerr, and Riina I. Bray. Arsenic, Cadmium, Lead, and Mercury in Sweat: A Systematic Review. *J Environ Public Health*. Article ID 184745 (2012): 1–10.

Sears, Margaret E., and Stephen J. Genuis. Environmental Determinants of Chronic Disease and Medical Approaches: Recognition, Avoidance, Supportive Therapy, and Detoxification. *J Environ Public Health*. Article ID 356798 (2012): 1–15.

Loit E, Tricco AC, Tsouros S, Sears M, Ansari MT, Booth RA. Pre-analytic and analytic sources of variations in thiopurine methyltransferase activity measurement in patients prescribed thiopurine-based drugs: A systematic review. *Clin Biochem* (March 18, 2011). 44(10-11):751-757.

Sears M. Toxic Metals Injuries. *Paed Child Health*. 2011;16(3):152.

Sharma M, Ansari MT, Soares-Weiser K, Abou-setta AM, Ooi TC, Sears M, Yazdi F, Tsertsvadze A, Moher D. Systematic review: comparative effectiveness and harms of combination therapy and monotherapy for dyslipidemia. *Annals of Internal Medicine* 151, no. 9 (November 3, 2009): 622-630.

Sharma M, Ansari MT, Soares-Weiser K, Abou-setta AM, Ooi TC, Sears M, Yazdi F, Tsertsvadze A, Moher D. Comparative Effectiveness of Lipid-Modifying Agents [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2009 Sep.

Sears M and Walker CR. Dioxins in Children. *Paediatric and Perinatal Drug Therapy*, 2007; 8 (3):134.

Sears M, Walker CR, van der Jagt RHC, Claman P. Pesticide assessment: Protecting public health on the home turf. *Paediatr Child Health* 2006;11(4):229-234.

Irwin D, Vaillancourt R, Dagleish D, Thomas M, Grenier S, Wong E, Wright M, Sears M, Doherty D, Gaboury I. Standard concentrations of high alert drug infusions across paediatric acute care. *Paed. Child Health* 2008;13(5):371-376.

Treen-Sears ME, Volesky B, Neufeld RJ. Ion exchange/complexation of the uranyl ion by Rhizopus biosorbent. *Biotechnol. Bioeng.* 1984;26(11):1323–1329.

Treen-Sears ME, Martin SM, Volesky B. Propagation of Rhizopus javanicus Biosorbent. *Appl Environ Microbiol.* 1984; 48(1):137–141.

Treen-Sears ME, Martin SM, Volesky B. Control of Rhizopus Biosorbents' Quality During Propagation. *Fundamentals of Applied Biohydrometallurgy*; Vancouver, BC; Canada; 21-24 Aug. 1985. pp. 305-308.

Volesky B, Sears M, Neufeld RJ, Tsezos M. Recovery of strategic elements by biosorption. *Annal NY Acad Sci* 1983.

Nadeau JS, Treen ME, Boocock DGB. Mass transfer effects in a nitric oxide dosimeter. *Anal. Chem.* 1978;50(13):1871-1873.

**Guest Editor: *Journal of Environmental and Public Health.*** Special issue on Incorporating Environmental Health into Clinical Medicine, published spring of 2012.

**Guest Editor: *The Scientific World Journal,*** Special issue on Environmental Health, published spring 2013

**Peer Reviewer:** Canadian Medical Association Journal; European Journal of Internal Medicine; Reproductive Toxicology; Journal of Forensic Sciences; Paediatrics and Child Health; Human and Experimental Toxicology; Public Health; Science of the Total Environment; and International Journal of Environmental Research and Public Health.

## **Book Chapter**

Davis, D, M Sears, A Miller, R Bray. Microwave/Radiofrequency Radiation and Human Health. In *Integrative Environmental Medicine.* A Cohen, FS vom Saal Eds. Oxford University Press. March 2017.

## **Recent Conference Participation**

- 2017 Presentations and participation in an experts forum at The Hebrew University, hosted by the Israeli Institute for Advanced Studies, and the Environmental Health Trust. “Wireless Radiation and Human Health.” Jerusalem, January 2017.
- 2015 **“Scientific Review to Support Public Policy Regarding Exposure to Radiation from Wireless Communications Devices.”** Poster. International Bioelectromagnetics Conference. Alisomar, California. June 2015
- 2014 **“Search and ye shall find environmental health concerns: e.g. Peace River Proceeding1769924.”** Invited Presentation. Under Western Skies Conference. Calgary. September 2014.
- 2013 **“Harvesting the Best from the Wilderness: Moving from Scouts' Common Sense, to Evidence-Based Practice for Environmental Health.”** Invited presentation. American Academy of Environmental Medicine. Phoenix, Arizona

## **Non-peer reviewed medical / scientific articles co-authored by Margaret (Meg) Sears**

**Ongoing, submissions regarding policy and laws improvements, and scientific comments regarding substances and exposures to the Government of Canada and others, on behalf of *Prevent Cancer Now*.**

<http://www.preventcancer.ca/main/resources/cancer-prevention-submissions>

### **Healthy Children/Healthy Environment: Improving the Odds: Part 2**

(authors in alphabetical order) Riina I. Bray, M. Janet Kasperski, Lynn M. Marshall, Margaret E. Sears. [March 31, 2011. Respectfully submitted on behalf of the Ontario College of Family Physicians to the Environmental Health Program, Health Canada.]

### **Air Travel and Chemical Sensitivities**

John Molot, Lynn Marshall and Meg Sears

[March 2009 – prepared for the Canadian Transportation Authority]

### **The Medical Perspective on Environmental Sensitivities**

Margaret E. Sears [February 2007 – prepared for the Canadian Human Rights Commission, in collaboration with the Ontario College of Family Physicians Environmental Health Committee, and other academics, physicians and architects]

Available at: <http://www.chrc-ccdp.gc.ca/eng/content/medical-perspective-environmental-sensitivities>

### **Comments on the Pest Management Regulatory Agency’s Use of Uncertainty and Safety Factors in the Human Health Risk Assessment of Pesticides**

M.E. Sears, C.S. Findlay, N. Arya, L. Marshall, M. Sanborn, K.J. Kerr, J. Kasperski

[2007 – prepared on behalf of, and submitted to the Pest Management Regulatory Agency (PMRA) of Health Canada, by the Environmental Health Committee, Ontario College of Family Physicians]