

Editor's Note

Our first virtual conference was a resounding success! Co-Chaired by Dr. Sophie Petropoulos and Marcel van de Wouw, and organized by Drs. Anita Kozyrskyj, Meghan Azad and Gerry Giesbrecht, the 2021 DOHaD Canada Conference was attended by almost 200 individuals, up by 90 from last year, of which 65% were trainees. Congratulations to the winners of the trainee presentation awards:

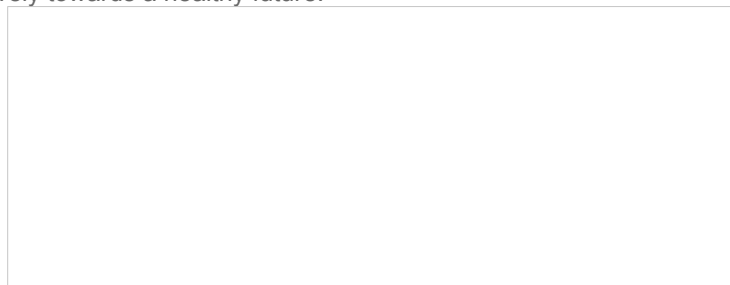
Flash Talks: (1) Grace Dione; (2) Elizabeth Elder and Carlene Cihosky; (3) Zuleika Leung

Oral Presentations: (1) Shelby Oke; (2) Queenie Li; (3) Nicole Rodriguez and Mateus Tomczyk

People's Choice Awards: Oral: Nicole Rodriguez; Flash Talk: Peter Johnson

Spread over 3 days, this year's conference highlighted emerging themes in DOHaD worldwide. Indeed, we had an excellent final day on the impact of COVID-19 and other natural disasters on stress levels of pregnant women and offspring health. Day 2 spoke to the importance of DOHaD in the postnatal period and the key role of breastfeeding. Day 1 was kicked off with a spectacular talk on the developmental origins of brain health, and sessions linking prenatal stress with the gut microbiome and early life neurodevelopment. This year's conference included international speakers and was attended by 25 persons from outside of Canada. These global connections are important and are facilitated by membership with the International DOHaD Society.

The year 2020 was a catalyst for change, and in that spirit the International DOHaD Society has also seen a rebranding. The new logo (below) is representative of a link in a chain, signifying strength, interdependency, and growth. The interlocking circle in the center represents the importance of the life cycle, and our interconnectedness across the life course. This icon additionally imbues a sense of togetherness across DOHaD's interdisciplinary, global network in working collectively towards a healthy future.



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Research Highlights: Dr. Laura Anderson

Cardiometabolic conditions, including obesity, diabetes, and cardiovascular disease, are leading causes of morbidity and mortality in Canada. The prevalence of chronic diseases has increased over recent decades, and for many of these diseases, there has been a shift towards earlier age at onset and increased severity. There are several well-established modifiable risk factors for cardiometabolic diseases and many of these risk factors are now prevalent during periods of early life, including pregnancy and early childhood. My research program seeks to understand if intervening on chronic disease risk factors in early life contributes to the primary prevention of chronic diseases across the life course.

I am a population and public health researcher with a focus on life course epidemiology. My research leverages linkages of large population-based data, including cohort studies, administrative data, and national surveys, to evaluate long-term outcomes. I am currently leading a CIHR funded project that is evaluating the impact of late preterm birth on cardiometabolic risk in children and young adults and identifying opportunities for early life interventions. This project builds on a unique linkage of the [TARGet Kids!](#) primary care research network to [ICES](#) administrative health data in Ontario. Given the challenges of conducting research over long periods, I have also focused on the methods for developing pre-clinical outcomes, such as the measurement of cardiometabolic risk scores in children ([Kamel et al. 2018](#)), and the validity of adult recall of early life weight ([De Rubeis et al. 2019](#)).

Lastly, it is well established that exposure to disasters, both natural and human-made, during pregnancy and childhood can have a profound impact on long-term health consequences. Several mechanisms have been proposed to explain these associations, including exposure to chronic stress, changes in healthcare access, and food restrictions. With the onset of the COVID-19 pandemic, my research team has now pivoted to focus on the potential long-term cardiometabolic consequences following exposure to a disaster ([De Rubeis et al. 2021](#)). The overarching aim of my research is to contribute to the primary prevention of chronic diseases and improve population health across the life course.

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Life as a DOHaD Canada Trainee: Shelby Oke

My Background

Originally from a small town in Southwestern Ontario (think <5,000 people), I stuck fairly close to home and completed an honours double major in physiology and biology at The University of Western Ontario. It was in my third year of study that I met my current supervisor, Dr. Dan Hardy, and I began working in his lab as an undergraduate student in 2015. Now in the fifth year of my PhD, I plan on pursuing a career in academia as I enjoy teaching and mentoring students at both the undergraduate and graduate level. I am current Vice President of Communications for the DOHaD Canada Trainee and Development Committee, and I also sit on the 2022 DOHaD World Congress Trainee and Networking Committee.

My Research

Barker's 'thrifty phenotype' hypothesis outlines that poor nutrition in early life induces permanent changes to long-term metabolism ([Hales and Barker, 2001](#)). While the effects of the *in utero* environment have been widely studied, the role of the postnatal environment in offspring metabolic health remains poorly understood. There is strong evidence to suggest that postnatal catch-up growth, or rapid postnatal weight gain, exacerbates the risk for metabolic disease in low birth weight offspring, and animal studies have been essential in determining the molecular mechanisms that govern this relationship.

Given that oxidative stress and mitochondrial dysfunction are associated with many metabolic pathologies, I'm interested in discerning how catch-up growth may influence mitochondrial function in low birth weight offspring. Our lab has previously shown that rat offspring born from a model of maternal protein restriction (MPR) exhibit asymmetrical IUGR, whereby growth of the liver is compromised relative to that of other organs ([Sohi et al., 2011](#)). These offspring undergo whole body and hepatic catch-up growth following the restoration of dietary protein, leading to dyslipidemia and glucose intolerance in adult life ([Sohi et al., 2011](#); [Vo et al., 2013](#)). My research has identified that adult male MPR offspring exhibit oxidative stress and mitochondrial dysfunction exclusively after experiencing catch-up growth, while offspring that are maintained on a low-protein diet appear to be protected from the effects of developmental programming ([Oke et al. 2020](#)). We are further investigating the role of catch-up growth in offspring exposed to gestational D9-tetrahydrocannabinol (D9-THC), as we've identified that this model produces offspring with symmetrical IUGR followed by complete catch-up growth by three weeks of age ([Natale et al., 2020](#)).

My Advice for Trainees

My student experience has been different from most, as I'm a single parent to an amazing 8½ - year old. My dual role as a student and parent has helped me recognize the importance of finding a sustainable work-life balance, which is something that I would advise all students to do early on in their studies. Additionally, I would highly recommend that trainees start forming their network as soon as possible. The annual DOHaD Canada meeting, the Canadian National Perinatal Research Meeting, and the upcoming 2022 DOHaD World Congress are great opportunities to do this. It was at our second annual meeting in Banff, AB that I started to get involved with DOHaD Canada, and I've established lots of great connections (and friends!) along the way.

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DOHaD Canada Trainee Committee Highlights

Hello DOHaD Canada members!

Firstly, we'd like to congratulate all of our trainees who presented at the annual Canadian National Perinatal Research Meeting this past February, and at the Scientific Meeting of the Canadian DOHaD Society a few weeks ago. While we are used to sharing our research and networking in person, this year's virtual format was conducive to bringing trainees together from across the

country.

Since our last newsletter, we have welcomed **Dr. Tamara Saez Gutierrez**, a Postdoctoral Fellow in the Department of Obstetrics and Gynaecology at the University of Alberta, to the Trainee and Development Committee. Tamara is the acting Vice President of Events for our committee, and she sits on the DOHaD Canada Education Committee as the trainee representative. She conducts her research in the lab of Dr. Sandra Davidge, where her interests focus on women's cardiovascular health. She is currently investigating cellular mechanisms of vascular dysfunction after having had a dyslipidemia-associated pregnancy complication, such as preeclampsia, which could contribute to the high risk of developing cardiovascular complications later in life. Welcome, Tamara!

We know that the last year has been tough, and we likely still have a few more tough months to go. As a committee, we have spent the last few months generating our **Engagement Survey for DOHaD Canada Trainees**. This survey aims to generate data that will assess the demographics and needs of our current trainees, which will help us better understand how DOHaD Canada can best provide support for the trainee membership. We invite all DOHaD Canada trainees to complete this survey, which can be found [here](#).

In the meantime, we'd like to introduce/remind everyone of upcoming opportunities that may be relevant to our trainees:

Workshops, Webinars, and Training Courses:

- ISRHML Trainee Mentorship Webinar Series— Regular webinar series hosted by The International Society for Research in Human Milk and Lactation. Details on the next webinar can be found [here](#).
- Mitacs training courses in leadership in management, communication and relationship building, personal and professional management, and entrepreneurialism (see [here](#) for details)

Awards:

- The International Society for Research in Human Milk and Lactation Trainee Expansion Program and Conference Awards. Details can be found [here](#).
- The International DOHaD Society Trainee Brain Mobility Awards. Details can be found [here](#).

Prospectus: DADE 2021

October 12 - 13, 2021

The 2021 International Congress on Domestic Animal DOHaD and Epigenetics (DADE) will be a world first since no congress on this new science has been held in connection with domestic animals. This

new science has been held in connection with domestic animals. This event aims to bring together researchers who are beginning to study how the environment influences the health of subsequent generations through a form of non-genetic transmission known as epigenetics. We now know that the health and particularly the metabolic or toxic status of the parents / progenitors can influence the phenotype of the offspring and sometimes over more than one generation. This phenomenon is based both on epidemiology; on an analysis of

populations according to a specific environment and epigenetics; on an analysis of the molecular mechanisms that pass information from one generation to the next. The potential repercussions in animal reproduction and selection are enormous since most domestic animals are used for the production of proteins and other animal products which depend on the metabolic health of individuals. Genetic selection has made it possible to transform several types of breeding and to feed the planet, but if we select for genes we often do not know how to calculate the effect of the environment and the importance of the health of the parents on the characteristics of the next generation. The disciplines concerned are therefore genetics, agronomy, animal nutrition, and veterinary medicine and few congresses currently intersect these various disciplines for a completely new approach to global health. This kind of congress does not exist in animals, and industries are starting to take an interest in it given the great potential that this science represents.

Abstract submissions: **June 14 - August 8, 2021**

Registration: **June 14 - September 10, 2021**

Complete details can be found [here](#).

Prospectus: DOHaD 2022

Planning for the DOHaD World Congress, to be held in Vancouver August 22-31, 2022, is well underway! This meeting is held in conjunction with the 12th annual meeting of the Kids Brain Health Network.

Keep visiting <https://www.dohad2022.com/program> as we post more details about the exciting programme we have planned! Some **programme highlights** include:

- 2 [pre-congress Satellites](#); Animal DOHaD and Indigenous health
- 2 days of workshops; Trainees; HeLTI
- 12 Keynote presentations, including Barker and Hales Award lectures
- 12 Trainee Plenary Award lectures
- 18 symposia, panels
- 72 oral presentations, job fair, public lecture(s)
- Poster presentations and “elevator pitches/talks”

We are also delighted to welcome the following **keynote speakers and panels**, with others to be announced shortly:

- Kang Lee, (Canada) AI, facial recognition
- David Edwards, (UK), MRI, Brain Imaging, President’s lecturer
- Elaine Holmes, (Australia), Microbiome in DOHaD and Ageing
- Tiffany Green, (USA), Health Economics, Health Equities
- Tracy Bale, (USA), Stress and neurodevelopment
- Shinichi Kuriyama (Japan), Harmonisation of genetics and lifestyle in personalised medicine
- Vikram Patel (USA, India), Burden of mental disorder, poverty and social disadvantage (Fraser Mustard lecturer, KBHN)
- Linda Richter (South Africa), Childhood adversity, pandemics (KBHN)
- Anne Ferguson-Smith (UK) Imprinting, Epigenetics
- Cesar Victora (Brazil), Child health and nutrition
- Peter Gluckman (New Zealand), Public policy panel
- Fiona Stanley (Australia), Indigenous health, health disparities, pandemics panel

Contact Janice Bailey or John Challis at bailey@DOHAD2022.com or Challis@DOHAD2022.com with your ideas and thoughts on any aspect of the workshops and main programme and/or to volunteer as reviewers, judges and session chairs.

Events

Facilitating Pregnancy Health Research: Innovative Strategies Monthly Webinars, presented by the Global Pregnancy Collaboration. Next webinar: **June 24, 2021**. Details can be found [here](#).

DOHaD Worldwide Webinars: "*Maternal microbiota during pregnancy facilitates metabolic programming of offspring*" by Dr. Koji Hase. **July 7, 2021**, hosted by the International DOHaD Society. Details can be found [here](#).

Academy of Health Sciences 2021 Virtual Forum: "*Healthy Start, Life-Long Impact: Eradicating Non-Communicable Disease*". **September 28 - 29, 2021**. Details can be found [here](#).

47th Annual meeting of the Fetal And Neonatal Physiological Society. **October 4-7, 2021** (Virtual). Details can be found [here](#).

Announcements

Publications

Dr. Julie Bergeron and colleagues published a cohort profile about the Research Advancement through Cohort Cataloguing and Harmonization (ReACH) initiative. The ReACH initiative aims to leverage research on DOHaD by providing the Canadian and international research community with a platform optimising data discoverability and facilitating co-analysis of harmonized data. As part of the project, a comprehensive web-based catalogue documenting 26 Canadian mother and child studies was implemented, as well as resources to support investigators interested in harmonizing and co-analyzing data across studies. The paper can be found [here](#).

Bhattacharjee *et al.* Does exercise during pregnancy impact organs or structures of the maternal-fetal interface? *Tissue and Cell* ([link to article](#)).

Easton *et al.* Syncytialization and prolonged exposure to palmitate impacts BeWo respiration. *Reproduction* ([link to article](#)).

Giza *et al.* The application of in utero magnetic resonance imaging in the study of the metabolic and cardiovascular consequences of the developmental origins of health and disease. *Journal of Developmental Origins of Health and Disease* ([link to article](#)).

Hardy *et al.* Exercise in pregnancy increases placental angiogenin without changes in oxidative or endoplasmic reticulum stress. *Medicine and Science in Sports and Exercise* ([link to article](#)).

Hula *et al.* Placental treatment improves cardiac tolerance to ischemia/reperfusion insult in adult male and female offspring exposed to prenatal hypoxia. *Pharmacological Research* ([link to article](#)).

Kennedy *et al.* Fetal meconium does not have a detectable microbiota before birth. *Nature Microbiology* ([link to article](#)).

Lauby *et al.* The role of interindividual licking received and dopamine genotype on later-life licking provisioning in female rat offspring. *Brain and Behaviour* ([link to article](#)).

Lee *et al.* Exposure to $\Delta 9$ -tetrahydrocannabinol during rat pregnancy leads to impaired cardiac dysfunction in postnatal life. *Pediatric Research* ([link to article](#)).

Moffat *et al.* Investigating the normalization and normative views of gestational weight gain: Balancing recommendations with the promotion and support of healthy pregnancy diets. *American Journal of Human Biology* ([link to article](#)).

Awards/Honours

Elizabeth Elder (McGraw Lab, Université de Montréal) was awarded FRQS, FRQNT and NSERC CGS-D Doctoral Awards!

Katharine Vadal (Petropoulos Lab, Université de Montréal), was awarded a FRQS and NSERC CGS-D Doctoral Awards!

Dr. Meghan Azad received the [Women's Executive Network \(WXN\) Top 100 Most Powerful Women](#) award at the end of 2020. This award recognizes the highest achieving female leaders across Canada.

Dr. Sandra Davidge received a Tier 1 mentoring award at the University of Alberta.

Dr. Stephen Matthews was awarded a Tier 1 Canada Research Chair in Early Development and Health.

Dr. Maria Ospina was awarded a Tier 2 Canada Research Chair in Life Course, Social Environments and Health.

Dr. Sophie Petropoulos was awarded a Tier 2 Canada Research Chair in Functional Genomics in Reproduction and Development.

Opportunities

Western is hiring two new faculty members with emphasis on Systems Biology and Bioinformatics approaches. Details can be found [here](#).

Multiple Graduate and Postdoctoral Positions are available in Dr. Kristin Connor's lab (<http://connorlab.ca>) at Carleton University, Ottawa. Candidates will investigate gut (microbes)-placental mechanisms regulating development and pregnancy health, and how novel interventions correct outcomes. Applicants should have mouse model experience. Contact Dr. Connor at kristin.connor@carleton.ca for more information and to express your interest.

Academic and job listings for DOHaD-related positions can also be found on the [DOHaD Canada](#) website under 'opportunities' and the [International DOHaD Society](#) website.

The DOHaD Canada Training and Education Committee is seeking feedback from the membership about their interest and needs in training and educational opportunities as the committee begins to develop a program to support our community and the public. They will shortly be sharing a short survey very soon and look forward to hearing from you. Please stay tuned!"

