



Research

Fall/Winter 2015



**FEATURE
STORY**

Pediatric MS

A window to early
MS triggers

MS RISK
FACTORS

5

SECURING
THE NEXT
GENERATION OF
MS RESEARCHERS

6

RECENT
MS RESEARCH
HIGHLIGHTS

7

contents

Fall/Winter 2015

PEDIATRIC MS

*A window to
early MS triggers*

3

THE MS PERFECT STORM

Risk factors

5

SECURING THE NEXT GENERATION OF MS RESEARCHERS

6

SNAPSHOT OF MS RESEARCH

*Recent
highlights*

7



@Dr_KarenLee

The number of Canadians who live with multiple sclerosis is greater per capita than in any other country in the world. While this fact may seem daunting, it also serves as a driving force behind Canadian MS research. Researchers are working hard to identify the genetic, environmental and lifestyle factors that influence a person's susceptibility to MS. We suspect that low exposure to sunlight, thus a deficiency in vitamin D, may be a contributing factor to the development of MS. Other strong theories, such as prior infection with Epstein-Barr virus or other agents, smoking, obesity and genetics, are also being investigated.

Studying MS in children may be a way to more fully understand the cause of MS. Once thought to be a disease that only affects adults, MS has been observed in children as young as two years old and in adolescents up to 18. Led by Canadian pediatric MS neurologist Dr. Brenda Banwell, the Canadian Pediatric Demyelinating Disease Network, made up of a cohort of children and young adults who live with MS and other demyelinating diseases, has helped uncover a wealth of information about the potential causes and underlying mechanisms of pediatric MS.

With newly awarded funding (\$3.2 million) from the MS Society and the MS Scientific Research Foundation, Dr. Banwell and her team will collaborate with 19 Canadian pediatric medical and research institutions to further examine pediatric MS. The new study seeks to better treat young people who live with MS while determining the impact on their quality of life, and the potential triggers of MS in people of all ages. Read more about the study on page 3.

Just as we make an effort to fund collaborative research, we are also dedicated to providing trainees with opportunities for scientific training, mentorship, networking and career development. Turn to page 6 to find out more about the ways in which we strive to attract, train and retain promising trainees across all academic levels.

A note of recognition and gratitude is extended to Roche Canada for their support of this edition of MS Research through an unrestricted educational grant. Nita Arora, North American head of clinical operations at Hoffman-La Roche Ltd. (Roche Canada) says, "As a research driven organization, we are excited to contribute to the scientific advancement and understanding of multiple sclerosis. We continue to examine new and innovative treatment pathways, and we hope to make a meaningful difference in the lives of people living with this devastating neurological disease."

Ultimately, research is possible because of the generosity of thousands of fervent fundraisers, donors and sponsors. I am always inspired by people who go above and beyond to raise critical funds for people living with MS. If you would like the opportunity to be creative with your fundraising, check out IChallengeMS.ca to raise money for Canadian MS research on your own time and in your own way.

For more MS research stories, visit my blog at DrKarenLee.ca or follow me on Twitter [@Dr_KarenLee](https://twitter.com/Dr_KarenLee)

Sincerely,

Dr. Karen Lee

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Pediatric MS

A window to early MS triggers



“ Studying pediatric MS gives us a unique window into the earliest aspects of the disease, enabling us to understand the risk factors that lead to the development of adult-onset MS. ”

Multiple sclerosis was originally thought to be a disease that occurred only in adults. While cases of pediatric MS were identified 40 years ago, diagnostic criteria for MS in children and adolescents have only been modernized within the past 10 years. It is estimated that, every year in Canada, 1 in 100,000 children experience symptoms that are suggestive of MS. While most of these children recover, 18 per cent of them will be diagnosed with MS.

Researchers have come a long way in understanding pediatric MS, which resembles a relapsing-remitting MS course in adults; however, there are still noteworthy differences between pediatric and adult MS. The presentation of

disability differs among children and adults, thus standard measures of disability – such as the Expanded Disability Status Scale (EDSS) – may not be the best way to monitor disease course in children. It is also unclear whether treatments commonly used by adults with MS are effective in children.

Studying pediatric MS is vital for two reasons: it can lead to specialized treatments for children living with MS, and help obtain clues about the cause and progression of MS at all ages.

“Studying pediatric MS will allow us to measure the variables that might influence children’s risk at the time they have just acquired them,” says Dr. Brenda Banwell, chief of neurology at



**Find out more about
the pediatric MS study
and its goals for
children and adults.**

Visit <http://bit.ly/1hivbU1>

The Children's Hospital of Philadelphia and adjunct scientist at The Hospital for Sick Children. "This gives us a unique window into the earliest aspects of the disease, enabling us to understand the risk factors that lead to the development of adult-onset MS."

Dr. Banwell has just received funding from the MS Society and its affiliated Multiple Sclerosis Scientific Research Foundation (MSSRF) to find out more about several aspects of pediatric MS. This work will build upon significant progress made by the Canadian Pediatric Demyelinating Disease Network. Established by Dr. Banwell in 2004 with funding from the MSSRF, the Network involved 23 leading pediatric research and healthcare institutions across Canada, whose work uncovered information about rates of pediatric MS and its physical and mental impact. Because MS is less common and difficult to diagnose in children and adolescents, the formation of large, comprehensive research networks is imperative to gather meaningful data that will inform clinical practice and improve quality of life.

For the new \$3.2 million collaborative study, Dr. Banwell joins MS experts Dr. Amit Bar-Or (McGill University), Dr. Douglas Arnold (McGill University), Dr. Ruth Ann Marrie (University of Manitoba), Dr. Ann Yeh (The Hospital for Sick

Children) and 19 Canadian sites to assess the effects of pediatric MS on mental wellbeing, cognitive impairment, depression, anxiety, physical activity and use of healthcare services.

"One of the objectives of our study is to understand what happens to children with MS as they become young adults," says Dr. Banwell. "We want to know: has there been an effect on school performance, entry into post-secondary school, entry into the workforce? What about their ability to start a family and integrate into society?"

The team's research will also focus on brain development and brain tissue loss in children and adolescents with MS, and will attempt to link what is observed on magnetic resonance imaging (MRI) and in immunological studies with how participants are faring overall.

Ultimately, we still do not know what causes MS. Studying risk factors in young people allows researchers to map out the earliest points of the disease, which may help us understand what is happening in adult-onset MS, before symptoms are present. Dr. Banwell and her team have the unique opportunity to determine why some children who experience an acute attack go on to develop MS, while others do not. By doing so, they will uncover the biological or environmental triggers of both pediatric and adult-onset MS that can be targeted through treatment.

 [For more information on the study, read the MS Update at **mssociety.ca/pediatricMS**](http://mssociety.ca/pediatricMS)



The MS Perfect Storm

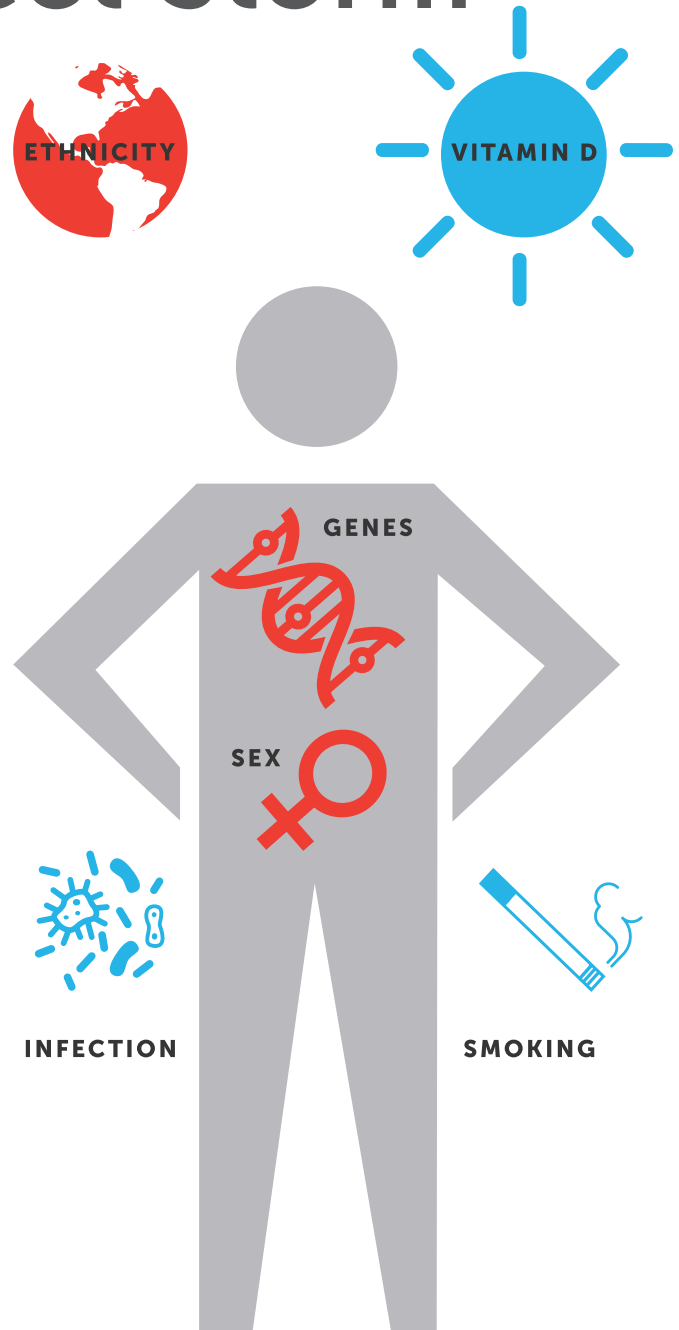
Risk factors

It's no secret that Canada has the highest rate of multiple sclerosis in the world. The question that continues to elude researchers is: why Canada? Decades of observation have revealed that people living in certain regions, possessing certain traits and receiving exposure to certain influences are more susceptible to MS. Also – women are three times more likely to develop MS than men. These variables, termed *risk factors*, may tell us more about what causes MS and why certain people are more likely to develop MS than others.

Over the years, researchers have identified a number of risk factors that, to varying degrees, may play a role in triggering the disease. For the full story on how each risk factor plays a role in MS, visit Dr. Karen Lee's blog at DrKarenLee.ca

“People who may be at a higher risk of MS can be mindful of the known modifiable risk factors and adapt their behaviour to hopefully reduce their risk of MS.”

– Dr. Helen Tremlett,
University of British Columbia



- FIXED RISK FACTORS
- MODIFIABLE RISK FACTORS

Securing the next generation of MS researchers

Funding Canadian MS research is vital for moving us closer to a cure for multiple sclerosis. Just as important, however, is supporting trainees who are on the path to becoming the brilliant MS researchers and clinicians of tomorrow. This two-pronged research funding approach nurtures the training, mentorship and innovation that is so crucial to scientific advancement.

The life of an MS research trainee moves through several stages, and we support those stages through grants and awards that allow trainees to focus on what they do best — learning more about MS. Your support can fund a trainee on their journey. Email lee.nichols@mssociety.ca to find out how you can establish an award in your name.



Snapshot of MS research

Recent highlights

Multiple sclerosis is Canada's disease — our country has the highest rate of MS in the world. Because of you — our donors, volunteers and event participants — we are able to fund promising avenues of research, such as nerve repair, cause, symptom management, progression and therapies.

For more details on MS Society funded studies and more, visit mssociety.ca/msupdates



Progression & therapies

New neuroprotective compounds may protect against nerve damage and stop MS progression

Neurodegeneration in progressive MS is characterized by extensive damage to nerve fibres of the central nervous system, which leads to the irreversible accumulation of disability. There are currently no approved therapies to treat neurodegeneration in progressive MS. In an exciting study published in *Nature Neuroscience*, postdoctoral fellow **Dr. Jeffery Haines** — jointly funded by the MS Society and Fonds de Recherche du Québec-Santé — identified a new class of neuroprotective compounds with the potential to combat MS progression. Dr. Haines found that these compounds were successful in stopping disease progression in mice by targeting both neurodegeneration and immune function. These early but encouraging findings are the first step towards a new type of treatment option for progressive MS.



Repair/ Remyelination

Pregnancy hormone prolactin reduces MS severity when paired with disease-modifying therapies

Women living with MS tend to experience fewer MS relapses during mid to late pregnancy and while breastfeeding. One possible explanation is that prolactin — the milk-producing hormone that is at its highest levels during late pregnancy and breastfeeding — promotes myelin repair. MS Society-funded fellow **Dr. Simon Zhornitsky** and principal investigator **Dr. Wee Yong** (University of Calgary) set out to demonstrate that prolactin, in combination with a disease-modifying therapy, can reduce disease severity, inflammation and demyelination in animals with an MS-like disease. Harnessing innate biological factors, such as prolactin, that potentially repair nerve tissue and alleviate inflammation may lead to the development of improved therapies for people living with MS.



Quality of Life

Running reduces MS-related pain

Exercise is a promising therapeutic option for MS-related pain, since it has already been shown to successfully alleviate other MS-related symptoms such as depression, fatigue and anxiety. A team of MS Society-funded researchers at the University of Alberta —including doctoral student **Curtis Benson** and Donald Paty Career Development Award recipient **Dr. Bradley Kerr** — studied the effect of wheel running on pain sensitivity in mice with an MS-like disease, and examined how the pain-processing centres in the spine changed following physical activity. They found that an hour of daily running can delay onset of MS-like symptoms and reduce pain sensitivity in mice, suggesting that healthy lifestyle factors like exercise can offer an effective non-drug based therapeutic strategy that can help to lessen MS symptoms and improve quality of life.

CANADA HAS THE HIGHEST RATE OF MS IN THE WORLD.



“NEW RESEARCH HAS MOVED MY DISEASE OUT OF PERMANENT DISABILITY AND INTO A LIFE WHERE I CAN FULLY PARTICIPATE AS A PHYSICIAN, FRIEND AND ACTIVE MEMBER OF MY COMMUNITY.”

- ALEX, DIAGNOSED WITH **MS** IN 2007

Thanks to the support of dedicated Canadians, the MS Society of Canada is a leader in building a world free of MS. With your support, we can continue to push the boundaries of what's possible in research, care and knowledge about the disease.

With your gift we can continue to make a profound difference in the lives of Canadians affected by MS.

Give today to end MS for all Canadians. mssociety.ca/give

