



Hope for Dementia

Almost Half of Cases May Be Avoided

The idea that lifestyle factors can influence the risk of dementia won't be news to Mind Over Matter® readers who are familiar with the Six Pillars of Brain Health - exercise, mental stimulation, social activity, nutrition, sleep, and stress management. But what proportion of cases could potentially be prevented by addressing modifiable risk factors?

WHILE AN EXPERT LANCET COMMISSION HAS BEEN ISSUING GLOBAL ESTIMATES SINCE 2017, NO SIMILAR RESEARCH HAD BEEN DONE TO LOOK SPECIFICALLY AT CANADA - THAT IS, UNTIL NOW.

Two studies published in 2024 offer evidence that dementia cases in Canada could be cut by up to half by addressing 12 modifiable risk factors. The research also identified which lifestyle risk factors are the leading contributors to dementia for Canadians, and how our country compares to other regions of the world.

A TALE OF TWO STUDIES

"The main aim of (our) study was to measure dementia prevention potential in Canada, because it had been estimated worldwide by the *Lancet* Commission, and it had been estimated in other countries, like the U.S., Denmark, and China, but it hadn't been done in Canada," said Surim Son, a researcher at

the Lawson Research Institute and St. Joseph's Health Care London in London, Ontario.

Ms. Son is also a PhD candidate in the Department of Epidemiology and Biostatistics at Western University, supervised by Dr. Mark Speechley and Dr. Manuel Montero-Odasso, and lead author of one of the studies, which was published in *The Journal of Prevention of Alzheimer's Disease* in June 2024.

A group of researchers at McMaster University in Hamilton, along with those from other Canadian institutions, conducted the other study, which appeared in *Canadian Journal of Public Health* in July 2024.

Both Ms. Son's group and the second team of researchers, working independently, used data from the same group of approximately 30,000 people enrolled in the Canadian Longitudinal Study on Aging (CLSA). Each of them also based their approach on that of the 2020 *Lancet* Commission on dementia prevention, intervention and care. Both teams focused on 12 well-established dementia risk factors.

Those covered in the study led by Dr. Aaron Jones, an assistant professor in the Department of Health Research [!\[\]\(d3102649f02e825ddb76dc3de0190154_img.jpg\)](#)

Methods, Evidence and Impact at McMaster University mirrored those in the *Lancet* report.

The list: less education, hypertension, hearing impairment, smoking, obesity, depression, physical inactivity, diabetes, low social contact, excessive alcohol consumption, traumatic brain injury, and air pollution. The Lawson researchers opted to replace air pollution with sleep disturbances.

"I did not include air pollution because when I designed the study, I wanted to include risk factors that we can improve with our daily actions, and that are easy to measure," Ms. Son explained. "I also wanted to include risk factors that can be targeted in clinical trials," she added.

"Currently, there are many lifestyle intervention trials going on across Canada, often targeting sleep disturbance along with other risk factors. However, addressing air pollution in clinical trials is hard, as it requires a provincial or national-level approach." (One of Ms. Son's research supervisors, Dr. Manuel Montero-Odasso, is a site principal investigator for one such study: the SYNERGIC 2.0 trial, as part of the Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia or CAN-THUMBS UP.)

POPULATION ATTRIBUTABLE FRACTION EXPLAINED

Both papers rely on a concept known as weighted population attributable fraction or PAF. "This approach was first introduced in the 1950s for lung cancer and cigarette smoking," Ms. Son explained.

"The measure incorporates both prevalence - how common the risk factor is - and the strength of the risk factor's association with dementia. This allows us to infer how many dementia cases can be avoided if we could eliminate a given exposure or risk factor from the population."

Ms. Son's and Dr. Jones' teams used different methods of calculating what's called "communality value," which is based on the degree to which each risk factor is correlated with every other risk factor. This is one reason the weighted PAFs differ across the two papers.

In contrast to the 2020 *Lancet* Commission report, which estimated that 40% of dementia cases were linked to 12 risk factors, Ms. Son's study placed that number at 49.2%. That means the proportion of potentially preventable cases in Canada could be even greater than half, since an updated 2024 *Lancet* Commission report, which added high LDL cholesterol and vision loss to the existing list of risk factors, estimated the expanded list accounted for an estimated 45% of dementia cases.

“The research suggests there is significant prevention potential in Canada through making changes in our daily lives.”

And since the prevalence of many risk factors tends to be higher among people belonging to historically marginalized groups (including racialized individuals and those living in rural areas), and CLSA participants are mostly white urban dwellers, "I think our estimate will be conservative if we consider Canada as a whole," Ms. Son said.

LEADING LIFESTYLE FACTORS

In Ms. Son's research, the four risk factors with the greatest influence on risk were physical inactivity (10% of cases), hearing loss (6.5%), obesity (6.0%), and hypertension (6.0%).

Overall, "83% of people had physical inactivity, which means they were not meeting the World Health Organization guidelines," which recommend a minimum of 150 minutes per week of moderate- to vigorous-intensity physical activity, said Ms. Son.

While the figures in the study led by Dr. Jones were slightly different, "overall, I think the papers tell similar stories," he said.

“WE CAN ESTIMATE THAT 40% TO 60% OF DEMENTIA CASES IN CANADA CAN BE ATTRIBUTED TO 12 MODIFIABLE RISK FACTORS, WITH PHYSICAL INACTIVITY, OBESITY, AND HYPERTENSION BEING HIGHLY IMPACTFUL.”

Ms. Son's research found that while the combined population attributable risk was similar in men and women, "prevalence of the most common risk factors differed across sexes," the study authors wrote. "Among women, 80% had physical inactivity and 20.8% had depression, as compared to 72.8% and 11.8% in men."

Two other key findings from that study, Ms. Son said, are as follows. "Over 95% of Canadians had at least one of the dementia risk factors that were listed in the *Lancet* report, which is huge, because we have participants starting from age 45. That means we should start prevention earlier, because almost all Canadians have risk factors at an early age. And over 80% of Canadians had four or more risk factors."

According to Ms. Son's study, more than 80% of Canadians were not meeting physical activity guidelines, one in three had obesity or hypertension, and one in five showed hearing loss.

HOW CANADA COMPARES INTERNATIONALLY

How does Canada stack up to other countries when comparing the modifiable risk factors examined in the 2020 *Lancet* Commission report? Here are some highlights of Ms. Son's comparison of estimates reported in the U.S., New Zealand, Australia, Denmark, India, Latin America, China, and Brazil. (Estimates for only nine of the 12 risk factors were available for all of these regions.)

Compared to other countries, weighted population attributable fractions (PAFs) in Canada were:

- Smaller for later life smoking and social isolation.
- Larger for later life physical activity, traumatic brain injury and excessive alcohol use.

Compared to low- and middle-income countries, Canadian PAFs were:

- Smaller for less early-life education and mid-life hypertension.
- Larger for mid-life obesity.

Compared to other high-income countries, Canadian PAFs were:

- Larger for less education in early life, mid-life hypertension, and later-life depression.

COMBINED PAFs

	ALL RISK FACTORS	NINE RISK FACTORS
Latin America	55.9%	55.9%
Canada	49.2%	40.9%
New Zealand	45.8%	41.5%
Brazil	45.5%	42.1%
India	41.2%	41.2%
U.S.	40.3%	36.0%
China	39.5%	39.5%
Australia	36.0%	35.5%
Denmark	35.2%	33.2%

IMPACT OF INCOME ON RISK

One characteristic Ms. Son and her colleagues did not consider was income, which, similar to education level, is a non-medical factor that influences health outcomes, also known as a social determinant of health. (For example, people with low income are often disadvantaged by reduced access to healthy foods and neighbourhoods that facilitate walking.)

Dr. Jones' team, on the other hand, did include such an analysis, stratifying participants into five groups by

household income, from less than \$20,000 per year to greater than \$150,000 annually (at the time of study enrolment, between 2011 and 2015).

The results were striking.

“As income level goes down, most risk factors increase.”

In fact, when categorized by weighted PAF, the 12 risk factors accounted for 58.7% of dementia cases in the lowest income group, but only 31.8% in the highest group, the paper stated.

“I hope this highlights the systematic issues that can contribute to increased risk of dementia,” Dr. Jones said. Income is “relevant to gender since we know that overall, women across their lifetimes earn less than men,” he added. (Dr. Jones is also involved in research looking at environmental risk factors for dementia, such as sleep disturbances related to occupations involving shift work and chronic noise in work environments and neighbourhoods.) ➔

PROTECTIVE STRATEGIES CALENDAR

To help inspire people to adopt lifestyle changes to reduce dementia risk, Ms. Son's team created a calendar that highlights the 12 protective strategies included in her study. You can find a QR code to request a copy here: www.clsa-elcv.ca/12-ways-to-reduce-your-dementia-risk/

PRIORITIZING PREVENTIVE STRATEGIES

On a policy-making level, the research of both teams can help governments prioritize which risk factors to target with prevention strategies.

On an individual level, the takeaway from the two studies is that “we can reduce our risk of dementia if we get physical activity regularly; protect our hearing from an early age and get it checked regularly; get our blood pressure checked regularly,” and work on maintaining healthy weight, said Ms. Son. She added this also applies to people with a family history of the disease.

“Tackling these key risk factors not only helps women prevent or delay dementia but also provides more years of healthy life and well-being.

Ms. Son continued, “Considering that 61.8% of Canadians living with dementia in 2020 were women, and this is expected to increase to over one million women in 2050, the potential benefits are substantial.”

POPULATION ATTRIBUTABLE RISK

LANCET COMMISSION 2020		SON ET AL.
EARLY LIFE		
Less Education (Less than high school grad.)	7%	3.2%
MID-LIFE (AGE 45 TO 64)		
Hearing Loss	8%	6.5%
Traumatic Brain Injury	3%	4.4%
Hypertension	2%	6.2%
Excessive Alcohol	1%	0.9%
Obesity	1%	6.4%
LATER LIFE (65+ YEARS)		
Smoking	5%	1.5%
Depression	4%	4.0%
Social Isolation	4%	0.4%
Physical Inactivity	2%	10.2%
Air Pollution	2%	N/A
Diabetes	1%	2.5%
Sleep Disturbances	N/A	3.0%
COMBINED PAF	40%	49.2%

(A breakdown from the study led by Dr. Jones isn’t included here because it didn’t categorize risks by life stage.)

	SON ET AL.		JONES ET AL.	
	MEN	WOMEN	MEN	WOMEN
Less Education	2.8%	2.8%	4.2%	4.4%
Hearing Loss	9.6%	8.7%	3.7%	3.0%
Traumatic Brain Injury	4.8%	3.1%	5.7%	3.9%
Hypertension	7.3%	7.2%	6.3%	5.7%
Excessive Alcohol	1.3%	0.5%	0.4%	0.3%
Obesity	6.0%	6.3%	5.7%	5.6%
Smoking	2.3%	2.5%	2.1%	2.1%
Depression	3.7%	6.5%	6.4%	8.8%
Social Isolation	0.5%	0.2%	5.4%	4.1%
Physical Inactivity	8.7%	10.0%	11.1%	11.9%
Diabetes	1.8%	1.4%	3.9%	3.2%
Sleep Disturbances	1.8%	1.4%	3.9%	3.2%
Air Pollution	N/A	N/A	0.8%	0.8%

The two research teams used somewhat different methodology, which is one reason the figures differ across the two studies. In some cases, they also used different definitions for the same risk factor.

For instance, in one study, social isolation was based on self-reports of engaging in a range of social activities less than once a week, while in the other, it was defined as having less than one social contact within a month with family, friends, or neighbours.