

January 2023



# Human Nature Projects Ontario *Newsletter*

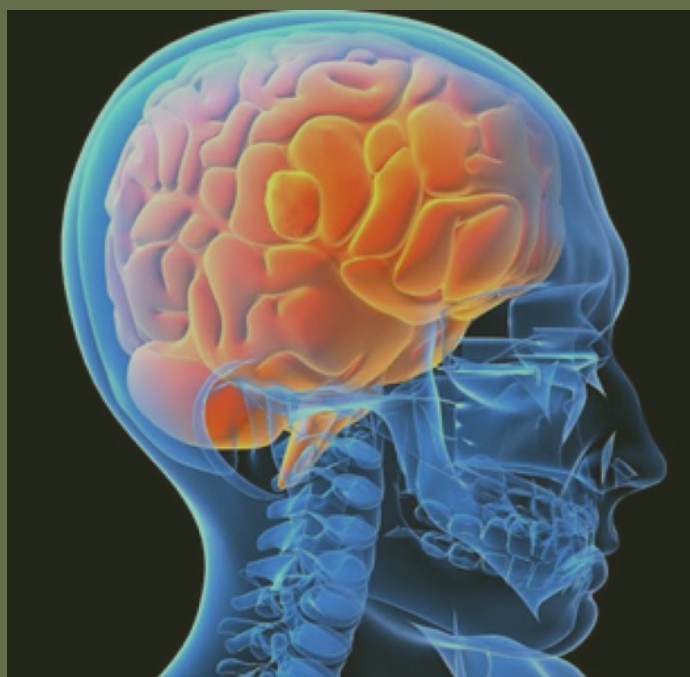
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(2015)



(Ayuda, 2020)

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## INTRODUCTION

Air pollution generally refers to chemicals, particles, and other substances with harmful effects that contaminate the atmosphere. This includes gases, such as carbon monoxide, methane, carbon dioxide, ozone and nitrogen oxides (Air Pollution | National Geographic Society, n.d.). It can also include biological matter like mold and pollen, or fine particulate matter.

The concentrations of these pollutants have increased drastically ever since the Industrial Revolution, due to people's reliance on fossil fuels as energy sources. This is particularly notable in countries with large populations, such as India, China, Pakistan and Egypt. Currently, air pollution is produced by factories, vehicles, household appliances and even natural sources like wildfires. Not only has this resulted in devastating consequences to the climate, but to human health as well.

Respiratory diseases and infections are obvious complications, but individuals with prolonged exposure to air pollution are also shown to have a greater likelihood of developing neurological disorders.



Figure 1. Smog covering India's sky (Getty Images, 2022).

## HOW AIR POLLUTION AFFECTS NEUROLOGICAL FUNCTION

The general consensus regarding air pollution is that PM 2.5, fine particulate matter less than 2.5 micrometers in size, can be extremely damaging to the nervous system. A study followed over 10,000 children aged 9-10, and measured their brain sizes in comparison to PM 2.5 levels in their environment.

They concluded that even at low concentrations, the particles played a role in reducing the size of different lobes in the brain (Cserbik et al., 2020). A similar study conducted on older women demonstrated that PM 2.5 reduces learning capability and short-term recall, while prolonged exposure increased the risk of Alzheimer's and other dementias (Younan et al., 2019). Further research on air quality in Taiwan indicated that high carbon monoxide, sulfur dioxide and nitric oxide levels correlated with low scores on the Mini-Mental State Exam (MMSE), which evaluates an individual's cognitive function (Chen et al., 2021).

## REDUCING AIR POLLUTION

Certain regulations are in place to limit greenhouse gas emissions, such as the Kyoto Protocol, which instructs countries to lower emissions by a pre-designated amount. This is particularly relevant in terms of carbon dioxide and methane levels. It encourages the use of greener technology, energy and infrastructure. The U.S. has also discussed a cap and trade system, where a company is limited on the amount of pollution they can create, and exceeding the cap would result in a fine (Air Pollution | National Geographic Society, n.d.). The World Health Organization (WHO) had also updated their air quality guidelines in 2006, aiming to reduce deaths from air pollution by 15%. Finally, individual contributions can also make a difference; if public transportation was more widely used and better funded, there would be less need for personal vehicles that play such a large role in greenhouse gas emissions.

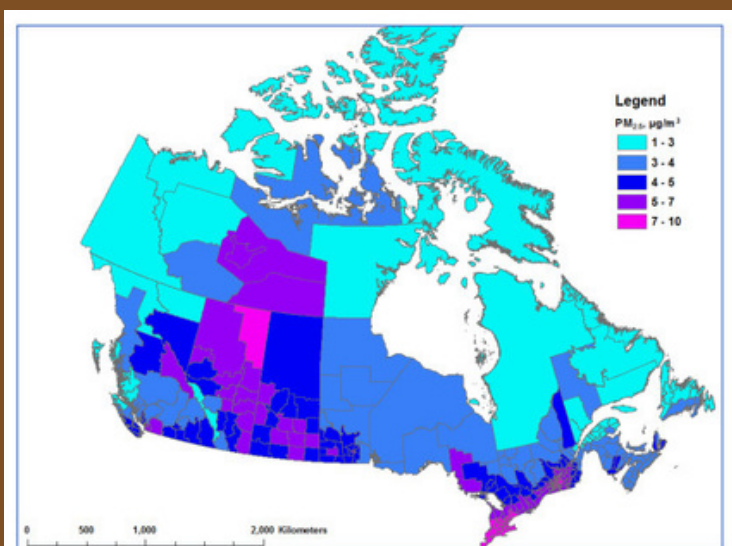


Figure 2. PM<sub>2.5</sub> concentrations across Canada. Three-year Population-weighted Average of Daily PM<sub>2.5</sub> Concentrations Across Canadian Census Divisions – 2015–2017 (Includes Air Pollution From All Sources, 2021).



# We Are HIRING!

## POSITIONS AVAILABLE:

- OUTREACH DIRECTOR
- OUTREACH ASSOCIATE
- MARKETING ASSOCIATE & CONTENT CREATOR
- LOGISTICS ASSOCIATE
- EVENTS ASSOCIATE
- COMMUNICATIONS ASSOCIATE
- FINANCE ASSOCIATE
- AMBASSADOR PROGRAM COORDINATOR
- HUMAN RESOURCES ASSOCIATE

**APPLY BY MONDAY FEBRUARY  
13TH, 2023 AT 11:59 PM!**

**JOIN  
OUR  
TEAM**

Descriptions of  
Positions:



Application Form:



# Air Pollution and Pregnancy



## INTRODUCTION

Air pollution, the release of pollutants in the air, can cause detrimental effects not only on the planet but also on human health. The World Health Organization (WHO) has reported that about 7 million deaths are caused by air pollution every year. Currently, nine out of ten people live in places that exceed WHO's guidelines on safe air pollutant levels. The majority of the people affected by such conditions are those who live in third-world and developing countries (Mackenzie & Turrentine, 2021).

Types of air pollution include: smog (outdoor), fire/smoke/tobacco smoke (indoor + outdoor), toxic chemicals (outdoors), household chemicals such as asbestos (indoors), and allergens such as mold (indoors and outdoors).

Air pollution poses many health risks in which pregnancy is also included. Air pollution can affect pregnant women as well as the developing baby. Pollutants are capable of entering the bloodstream into the placenta which disrupts the fetus' development.

The effects of air pollution on pregnancy depend on three factors. Firstly, in what developmental stage does the fetus become exposed to the air pollutant. Secondly, how long the exposure lasts and the amount of air pollution. Lastly, the specific kind of air pollutant that the mother or baby was exposed to.



Figure 3. Indoor and outdoor generated PM2.5 concentrations (EarthDay, 2021).

## AIR POLLUTION ON PREGNANCY OUTCOMES

### Preterm labor

Women can give birth to their baby earlier than 39 weeks when being exposed to air pollutants. Preterm labor causes other issues such as low birth weight, underdeveloped lungs, and even death of the baby during or shortly after birth (Villines, 2020).

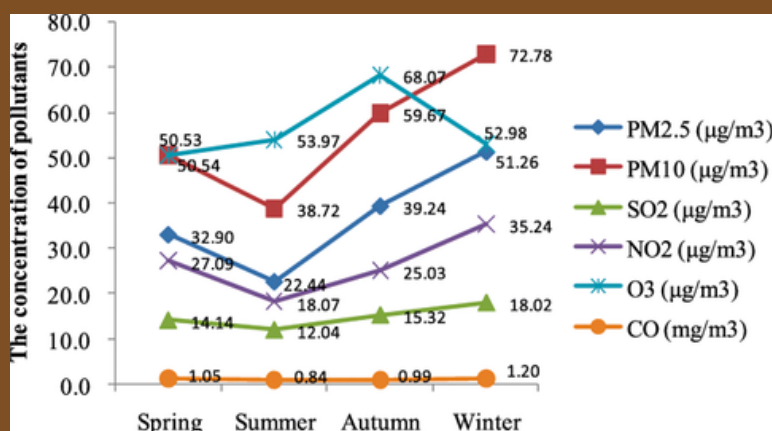


Figure 4. The association between pollution and preterm labour. Different concentrations of the pollutants are seen at different seasons (Liu et al., 2019).

### Stillbirth

Stillbirth is the death of a baby which occurs after 20 weeks. A study conducted in 2018 revealed the correlation between exposure to air pollution and stillbirth. Researches observed that the risk of stillbirth when exposed to air pollutants was highest during the third trimester (Villines, 2020).

## PREVENTION

To prevent or reduce the negative effects of air pollution, a few measures can be taken. To begin with, pregnant individuals and their families can evacuate to a safer area when the air quality reaches a dangerous level. Another measure is to have the home tested for any household chemicals such as asbestos. Moreover, installing a carbon monoxide detector can prevent carbon monoxide poisoning. Furthermore, it can be beneficial to stay indoors as much as possible or wear a mask when going outdoors to limit the exposure to air pollution. Simple protection strategies like these may help to reduce the harmful effects that air pollution has on pregnancy (Villines, 2020).

# Executive of the Month



*congratulations*



**ABTIN ZAKER**  
HUMAN RESOURCES  
CO-DIRECTOR



"Hello! I'm Abtin and I am a student at Glebe Collegiate Institute. I joined HNP because I felt I needed to do more for the environment as we are in an extremely dangerous spot with climate change. I feel like with HNP, I can make a difference. During my free time, I like to watch films, study history, and read poems."





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