state of the air 2024-25

FOREWORD *by Christopher Lam, President & CEO, BC Lung Foundation*

Breathe in. Breathe out. It's easy to take for granted when you don't really think about it. But as we move through our ever-changing world, it has become increasingly clear how important breathing clean air truly is to our health and well-being.

This is why we're taking action in British Columbia (BC) by reaching people in new ways, prioritizing public health, and exploring what's possible. The State of the Air Report is an annual publication to address the challenges ahead while providing promising updates in technology, research, and initiatives across BC.

Wildfires are increasing in frequency and severity in our province, causing devastating impacts on the landscape and our air. Air quality monitoring has become a powerful resource, and an influential decision-making tool designed to keep people informed and safe. We highlight efforts from the BC Centre for Disease Control (BCCDC) to mitigate wildfire smoke in BC care facilities and understand the implications of indoor $PM_{2.5}$ on respiratory health. The initiative emphasizes the importance of indoor air quality monitoring and the power of technology to gather data and aid in decision-making when it comes to supporting our most vulnerable communities.

At this year's Air Quality and Health Workshop, experts in neuroscience, environmental science, and public health gathered to share their research relating to 'Air Pollution & Lifelong Brain Health'. Many studies showed a connection between air pollution exposure and cognitive development and function, including global increases in ASD (autism spectrum disorder), ADHD (attention deficit hyperactivity disorder), and dementia. Overall, the workshop highlighted the need to confront the burden of disease amongst an evolving demographic by taking steps to address the dangers of air pollution and explore solutions to mitigate ongoing negative health effects.

With the threat of increased exposure to air pollution leading to both short and long-term health effects, we suggest strategies for decision-making during smoke events. Staying active is an important aspect of health; the report includes information on appropriate exercise to engage in during wildfire events and how to assess air quality.

We also review how air quality in BC compares against provincial and national objectives and examine trends throughout the years of air pollutants, including $PM_{2.5}$, ground-level ozone, nitrogen dioxide, and sulphur dioxide. Monitoring trends in air quality helps to identify pollutants, evaluate actions taken, and over time work towards improved air quality.

With many exciting initiatives in place in BC, the future is hopeful. The State of the Air Report includes updates from partner agencies including incentives to exchange wood stoves, air quality status reports, and new studies, standards, bylaws, and resources to address poor air quality, pollution, and wildfires.

What we know for sure is that more information leads to better decision-making, highlighting the importance of increasing education and engagement of protective measures and tools during times of increased air pollution. Join us as we take steps to keep up with our changing planet, reduce risk, diminish health inequities, and build a sustainable future.

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Tackling Indoor Wildfire Smoke at Care Facilities in BC

Low-cost air quality sensors have become essential public health tools in communicating air quality information, especially for fine particulate matter ($PM_{2.5}$) from wildfire smoke. These sensors increasingly fill spatial gaps in conventional air monitoring networks, provide real-time air quality data on maps and dashboards, and support research on indoor and outdoor pollution. They are used in homes, businesses, and community spaces. As their use spreads across urban and rural communities in BC and beyond, it's critical to evaluate their effectiveness in informing the public and promoting protective actions, particularly for sensitive populations.

Young children in childcare and patients in long-term care facilities are especially vulnerable to wildfire smoke exposure. Children are at greater risk due to their higher breathing rates and developing lungs, and their lack of agency to take protective actions. In long-term care facilities, patients, who are typically older and dealing with chronic diseases, are also highly sensitive to air pollution and often rely on caretakers for protective measures. However, little is known about the air quality at these facilities during wildfire smoke events in BC.

In 2022, the BC Centre for Disease Control (BCCDC) partnered with over 40 childcare and five long-term care facilities to deploy low-cost air quality sensors indoors and outdoors. Using a community science approach, the facilities installed the air quality sensors, and the project aimed to: (1) estimate $PM_{2.5}$ infiltration and characterize indoor air quality during wildfire smoke events and (2) develop a web-based air quality data dashboard for use by these facilities. Two wildfire seasons later, the data revealed that indoor air quality could worsen, with indoor $PM_{2.5}$ increasing by up to 300% during moderate to severe smoke episodes, although the impact varied significantly by building. The dashboard has been providing real-time air quality data to facilities for over two years, including BC's severe wildfire season of 2023.

Building on this, BCCDC researchers conducted a survey in the spring of 2024 to evaluate the dashboard's effectiveness and identify common protective actions taken at care facilities. Consistent with a severe wildfire season, the survey showed that 60% of respondents experienced more than 14 days of wildfire smoke in 2023, with 25% experiencing between 5 to 14 days of smoky days. Among participants, 66% used the dashboard. Among users, 47% relied on the dashboard's real-time data to protect children or patients from air pollution exposure during the 2023 wildfire season. The most common protective action was closing windows and doors, followed by modifying outdoor activities. Less frequently reported actions included turning on air conditioners or changing ventilation settings, with just one respondent using a portable air cleaner in response to the air quality information. These reported behavioural responses suggest a need for public health messaging to place a greater emphasis on the importance of ventilation and portable air cleaners (or DIY box fan filters) as a proven way to protect indoor air quality during wildfire smoke events.

The survey also highlighted opportunities for improvement of the BCCDC air quality dashboard. While users generally rated the dashboard's usability favorably, those who did not use the data for decision-making had less favorable views about the dashboard's usability. Key issues included the dashboard's interface and organization, the time it took to view a facility's indoor or outdoor air quality, challenges in interpreting the air quality data, as well as a need for more specific guidance on protective actions. In response, the dashboard underwent significant updates to address these barriers to its usability. The dashboard now provides tailored advice for different sensitive populations and more detailed guidance on effective measures, such as portable air cleaners and DIY box fan filters, which are proven to help protect indoor air quality.

Young children in childcare and patients in long-term care facilities are especially vulnerable to wildfire smoke exposure.

The overarching conclusion of this project is that low-cost air quality sensors, coupled with a data dashboard, can help inform decision making at care facilities in BC during wildfire smoke events. However, there is significant variability in the uptake of its usage, suggesting a need for better engagement with partners focusing on the usage of these tools. Additionally, the usability of the dashboard significantly influenced whether the information helped to motivate taking protective actions. Users also preferred to receive guidance on when and how to act to protect vulnerable populations at their facilities. The BCCDC is taking these lessons learned and now applying them to an expansion of the project into cleaner air spaces in BC.

Reassessing Wildfire Smoke Exposure: The Critical Role of Indoor $PM_{2.5}$

The health risks related to fine particulate matter ($PM_{2.5}$) from wildfire smoke, particularly for asthma patients, are well-documented in BC. Studies have shown increased hospital visits and asthma inhaler use during smoke events. However, these studies have only looked at $PM_{2.5}$ in outdoor air, while Canadians spend most (>80%) of their time indoors. Public health guidance also encourages people impacted by wildfire smoke to remain indoors and improve indoor air filtration to minimize exposure to harmful particles.

Given this, indoor $PM_{2.5}$ levels during extreme wildfire smoke events may differ significantly from outdoor levels. Several recent studies conducted in North America have found that indoor $PM_{2.5}$ levels during more extreme wildfire smoke events are just a fraction of outdoor $PM_{2.5}$ levels, indicating that infiltration of $PM_{2.5}$ decreases significantly during smoky periods. This suggests that the epidemiological evidence regarding respiratory health risks associated with wildfire smoke are biased because the underlying data rely exclusively on outdoor estimates of $PM_{2.5}$ exposure. Unfortunately, it is unknown whether the health effects of wildfire smoke may be underestimated or overestimated because of this inherent bias.

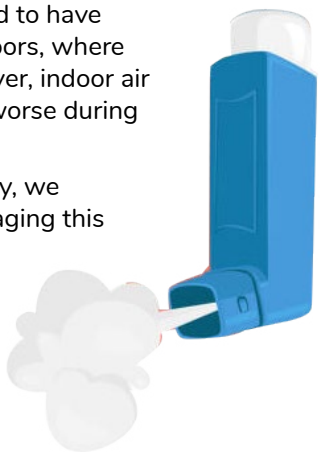
Studies have shown increased hospital visits and asthma inhaler use during smoke events.

At the British Columbia Centre for Disease Control (BCCDC), we have been trying to address this source of uncertainty in the wildfire smoke epidemiological data. Through our low-cost air quality sensor project, we identified that infiltration of $PM_{2.5}$ during wildfire smoke events was highly variable between facilities. The lesson learned from this finding was that not all populations that are similarly impacted by wildfire smoke in the outdoor environment would be expected to have similar exposures to wildfire smoke indoors, where people spend most of their time. Moreover, indoor air quality tended to become significantly worse during smoky conditions.

Building on the results of our initial study, we recently explored the feasibility of leveraging this indoor-outdoor sensor network to build a machine learning model that accurately predicts indoor $PM_{2.5}$ for the BC population. This work demonstrated that it is feasible to accurately predict indoor $PM_{2.5}$. However, the public health implications of this finding were less clear.

To better understand the implications, we then compared the differences in the effect estimate size on acute respiratory health when estimating exposure to indoor $PM_{2.5}$ versus outdoor $PM_{2.5}$ during the wildfire season in BC. Results of this analysis showed that the incidence of asthma inhaler use increased at a higher rate as indoor $PM_{2.5}$ increased, relative to the increase when relying on outdoor $PM_{2.5}$ estimates of exposure. Specifically, the magnitude of the relationship nearly doubled when relying on the indoor exposure estimates. Our analysis also showed that predicted infiltration of $PM_{2.5}$ during the historic 2023 wildfire season was widely variable across BC, with regions like Vancouver Coastal Health more susceptible to $PM_{2.5}$ infiltration compared to the Interior Health region.

While this is only the first large-scale study to estimate the association between indoor $PM_{2.5}$ and respiratory health in North America, it does suggest that relying exclusively on outdoor estimates of wildfire smoke exposure may significantly underestimate impacts on respiratory health. The doubling of the effect size could be explained by the fact that $PM_{2.5}$ levels indoors are often about half of what they are outdoors. This means that indoor air quality measurements may provide a more accurate reflection of true exposure during wildfire events. Since people spend most of their time indoors, relying solely on outdoor $PM_{2.5}$ data overestimates actual exposure. When indoor $PM_{2.5}$ is factored in, the health impact—such as asthma inhaler use—appears stronger because it represents a closer measure of what people are breathing.



Given we already know that people with asthma are highly susceptible to adverse respiratory effects from wildfire smoke exposure, this study underscores that protecting indoor air quality is vital during smoky outdoor conditions. The study also highlights the utility of low-cost air quality sensors in helping us understand the impacts of wildfire smoke events on indoor air quality. Moreover, low-cost sensors can provide indoor $PM_{2.5}$ levels in real-time, which can be used as a decision-making tool to protect indoor air quality.

Air Quality and Health Workshop 2025

Air Pollution & Lifelong Brain Health

The health effects of air pollution are becoming increasingly evident, including the long-term effects on our brains. The 22nd annual Air Quality & Health Workshop on April 8th, 2025 was held in Vancouver, BC, and invited experts from across North America to share their findings relating to air pollution exposure and brain health. Researchers from across the fields of neuroscience, environmental science, and public health discussed associations of declining cognitive development and function with air pollution exposure. Findings from multiple studies emphasize the need for a multidisciplinary preventative approach to address declining brain health especially as our population ages and extreme weather events such as wildfires become more frequent.

1. **Dr. Eric Smith** from the University of Calgary opened the conference with an overview of the biological effects of air pollution on the brain. Setting the foundation for the day, he spoke about brain health and clinical cognitive disorders, and the public health impacts of dementia, the most severe form of decreased brain health. While there are multiple risk factors across different life stages that need to be addressed to tackle dementia, air pollution has been identified as a potentially modifiable risk factor for poor brain health. Further exploration of the relationship could support expansion of pollution control and new prevention strategies for dementia.

2. **Dr. Catherine Karr** from the University of Washington spoke about the threat of air pollution on child cognitive development. She first focused on early life exposure and highlighted that several studies using comparable assessments demonstrated supportive evidence that exposure to air pollution ($PM_{2.5}$, PM_{10}, NO_2) was associated with reduced BSID scores (Bayley Scales of Infant and Toddler Development). However, the evidence is more mixed when looking at perinatal air pollution exposure and IQ in school-age kids. New studies are looking at preconception, but associations have been observed. Overall, research to date indicates the importance of reducing air pollution exposures in early life.

3. **Dr. Rebecca Schmidt** from the Department of Public Health Sciences and the MIND Institute and the University of California Davis School of Medicine discussed the risks of air pollution exposure on early life and childhood neurodevelopmental and behavioral outcomes. She spoke about the risk of both ASD (Autism Spectrum Disorder) ADHD (Attention Deficit Hyperactivity Disorder) when exposed to air pollution, drawing on multiple studies which found associations for increased risk of ASD; however, noting that while air pollution has been decreasing until recent years, the prevalence of autism has been increasing over time. She highlighted the significant vulnerability in early life to environmental exposures like air pollution, and the threat that exposure to wildfire smoke during pregnancy could have long-term effects on health.

4. **Dr. Meredith Pedde** from the University of Michigan highlighted the dangers of school bus emissions as they relate to cognitive function, by providing an overview of a clean school bus rebate program and a study on its health and educational benefits. The study compared educational performance between schools selected for funding to replace old buses, and those not selected. This initiative naturally allowed for a randomized controlled trial design, and results indicated that replacement of older buses translated


Dr. Eric Smith


Dr. Catherine Karr


Dr. Rebecca Schmidt


Dr. Meredith Pedde


Dr. Chris Carlsten


Dr. Stephanie Cleland

to improvement in educational performance and attendance compared to schools without new buses. These findings highlighted the importance of reducing exposure to bus emissions and the value of the investment in the program as replacing old buses appeared to positively impact student's performance.

5. **Dr. Chris Carlsten** of the University of British Columbia spoke about the effects of air pollution on cognition. Using the Air Pollution Exposure Lab (APEL) for controlled human exposure to diesel exhaust and other inhalants, this research study used a crossover design involving 28 participants and indicated an impairment to functional brain connectivity when exposed to diesel exhaust. The results highlight a potential impact on chronic disease and the need for further safety implications to protect against environmental and occupational exposures.

6. **Dr. Stephanie Cleland** of Simon Fraser University and Vancouver Coastal Health Research Institute spoke about the dangers of wildfire smoke and how short-term exposure can influence cognition. Her study measured cognitive performance of adults through the brain training game, Lumosity, which focused on attention when individuals were exposed to wildfire smoke (tracking daily and hourly $PM_{2.5}$ and smoke density of participant locations). The effects appeared to be small but significant, showing an association between $PM_{2.5}$ exposure and a 6.8% decline in game score. The results cautioned that small effects could lead to a larger impact, indicating a need for smoke risk communication to consider cognitive effects of wildfire smoke exposure.

7. **Dr. Sandi Azab** of McMaster University discussed a cohort study through the Canadian Alliance for Healthy Hearts and Minds (CAHHM), which investigated the association of low-level exposure to air pollution on an apparently healthy population to cognitive function and brain health. The study also considered cardiovascular risk factors and the influence of greenspace. The results indicated long-term exposure to air pollution was associated with declining cognitive function, and these results remained consistent through different models. Further studies to explore vulnerable populations, the impact of strategies to reduce air pollution exposure, and greenspace exposures on cognitive function is needed to address the knowledge gap.

8. **Dr. Sara Adar** from the University of Michigan addressed the role of $PM_{2.5}$ emission sources in dementia risk, exploring an association between long-term $PM_{2.5}$ exposures and cognitive health decline and if different emission sources influence decline. Using the environmental predictors of cognitive health and aging (EPOCH) study, prediction models were applied to evaluate the relationship between long-term air pollution exposures and cognitive decline including dementia over time. Results indicated evidence of associations with cognitive decline and risk of dementia in late life and suggested stronger associations with agricultural and wildfire particle exposure as emission sources. This work is being replicated globally in 8 cohorts to further investigate findings.

9. **Dr. Michael Brauer** of the University of British Columbia and the Institute for Health Metrics and Evaluation at the University of Washington discussed Canadian and BC studies which investigated the association between air pollution and dementia within 3 population-based cohorts, as well as the potential effect of green space. Using Cox proportional hazard models to develop hazard ratios, road proximity was compared to hazard ratio and both studies found that there were higher hazard ratios for those over 65 years old, and that greenspace exposure slightly mitigates air pollution effects. In addition, a systematic review of health effects of long-term $PM_{2.5}$ exposure indicated that a high burden of dementia is attributable to air pollution both in Canada and globally.

10. **Dr. Parminder Raina** of McMaster University ended the workshop by discussing the importance of brain health at the societal scale. He highlighted the demographic shift of population growth, increased life expectancy, and damaging climate change effects, and the influence that these have on society. With projected increases in dementia cases in Canada, he emphasized the need for prevention of cognitive decline to delay onset of dementia and reduce the burden on caregivers. He concluded by identifying factors, specifically agism, stigma, racism, and discrimination, which require attention to improve brain health across generations.

Dr. Sandi Azab

Dr. Sara Adar

Dr. Michael Brauer

Dr. Parminder Raina

Summary of Health Impacts of Wildfire Smoke

The devastating LA fires have drawn attention to the increasing frequency and intensity of wildfires throughout a fire season that continues to lengthen. In addition to the massive devastation and direct loss of life, research has clearly demonstrated that smoke from wildfires presents a risk to population health far beyond the immediate area of fire impact. Public health agencies and communities in general have made great progress in developing communication, guidance, and prevention strategies to reduce the health risk posed by wildfire smoke. However, a rather new phenomenon has emerged in the past decade where fires have burned through entire communities, incinerating homes, commercial buildings, cars, and numerous manufactured products and materials typically present in our communities. The LA fires are only the most recent example, but these events have become much more common. For example, the Fort McMurray fire of 2016 destroyed nearly 2500 homes and businesses, 18,000 structures were burned in Paradise, California in 2018, 1100 homes were destroyed in a single day in Marshall, Colorado in 2021, over 500 buildings burned in Lytton, BC in 2021, roughly 200 homes destroyed in West Kelowna, BC in 2023, 2000 homes lost in the Lahaina, Hawaii fire of 2023, and 358 structures were destroyed in Jasper, Alberta in 2024.

Each fire is different and the associated risks are likely to vary depending upon the intensity and extent of the fire, the number, age, and types of structures and materials burned as well as characteristics of the soil and water sources.

When structures and household belongings burn, smoke is likely to contain high levels of some heavy metals, including lead, with measurements indicating elevated levels well downwind of fires. As these large structural fires become more common, new potential hazards have also emerged, including contamination of soil and groundwater due to degradation of plastic pipes and deposition of persistent contaminants such as heavy metals in ash; exposure to flame retardants; inhalation of asbestos, demolition, and re-entry. For first responders and others exposed to persistent smoke, masks or air cleaners that typically protect against particulate matter—the most hazardous component of wildfire smoke—do not protect against highly irritating gases. These gases are released when plastics commonly found in most modern homes burn. First responders and outdoor workers may be at particular risk, but residents or contractors re-entering fire-damaged areas or those living in close proximity to destroyed structures should also be aware of potential risks, especially regarding deposition onto surfaces and soil.

As these events will likely become more common, there is a need to further understand the potential health risks and to develop guidance for first responders, the public, and those involved in cleanup and rebuilding. At present, specific regulations are atypical and responsibilities are often unclear – encompassing fire safety, insurance, environmental, public health, and occupational safety agencies. It is increasingly common for public health agencies to issue guidelines for cleanup and for those returning to contaminated areas, while extensive cleanup and disposal activities along with drinking water restrictions are becoming the norm, post-fire. Each fire is different and the associated risk are likely to vary depending upon the intensity and extent of the fire, the number, age, and types of structures and materials burned as well as characteristics of the soil and water sources. For example, following the Fort McMurray fire, elevated levels of dioxins and furans, polyaromatic hydrocarbons, mercury, arsenic, and other metals were measured in ash samples, with most of the arsenic originating from treated wood. The contaminant levels in ash initially precluded residents from returning to homes in several neighborhoods. Before re-entry, several inches of top soil were removed in areas with burned structures and the soil taken to landfill.

Fire retardants dropped from the air are increasingly used in heavily populated areas. The active ingredient in the most commonly used fire retardant is ammonium phosphate fertilizer which is irritating to skin and mucous membranes when contacted directly, but otherwise not known to cause long-term human health impacts. However, recent research has identified a number of metals, including chromium, arsenic and lead in approved flame retardants, suggesting that their use may contribute to elevated metal levels found in soil and on surfaces post-fire.

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Studies of health impacts following these fires are rare, but will very likely become more common after the LA fires. A Canada-wide study did not differentiate between exposure to burning of vegetation and manufactured materials but raises concern and a need for further study as it measured increased risks of lung and brain cancers with proximity to wildfires. A study of residents in homes not destroyed but adjacent to the Marshall fire reported increases in itchy or watery eyes, headaches, cough, sneezing, and sore throats even one year post-fire. Reporting of symptoms was more frequent for those whose homes were damaged by smoke or ash.

Given that events like the LA and Lytton fires will likely continue to occur with increasing frequency, the results of environmental measurements and the limited health research from past fires highlight a need for effective regulations and continued development of evidence-based guidelines for cleanup and prevention.

Making Decisions During Wildfire Smoke

In British Columbia, we are becoming more accustomed to frequent air quality warnings related to wildfires. Unfortunately, these events are becoming more frequent, severe, and longer in duration. It is clear that a physically active lifestyle is an important factor for the prevention and treatment of non-communicable disease, but what happens to the positive health effects of sport and physical activity during a wildfire event? How do we navigate this balance?

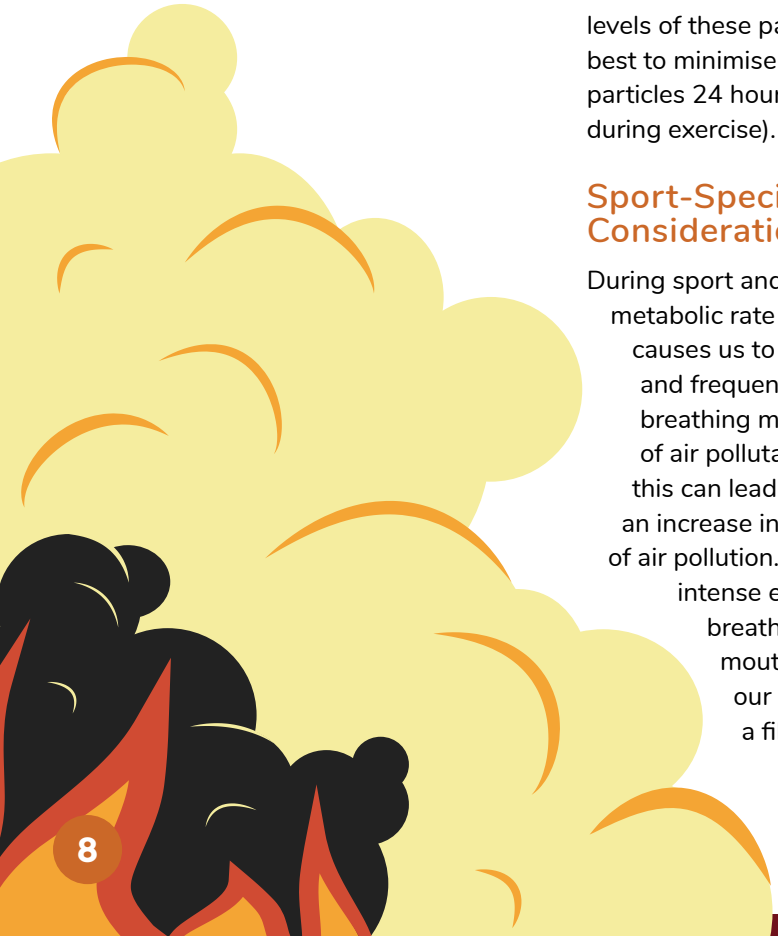
Wildfire Smoke

When we consider the health effects of any type of air pollution, we need to consider the specific "recipe" of that type of pollution, meaning the predominant makeup in terms of particle types and gases. Wildfire smoke composition depends on what is being burned, and the environmental conditions at the time. Smoke is especially high in particulate matter, but also contains gases such as carbon monoxide and nitrogen dioxide. It is these particles which are of special concern, especially the fine ones that are able to travel from the lungs and into the bloodstream, leading to health effects throughout the body. The long-term negative health effects of fine particles include lung disease (e.g. chronic obstructive pulmonary disease, and lung cancer), heart disease (e.g. heart attacks), type 2 diabetes, and even dementia. During a wildfire event, the concentrations of these particles can be extremely high. We therefore need to be aware of the levels of these particles and do our best to minimise our exposure to these particles 24 hours per day (i.e. not just during exercise).

To reduce their exposure, individuals might consider indoor exercise as a safer alternative during a wildfire event.

Sport-Specific Considerations

During sport and physical activity, our metabolic rate is increased, and that causes us to increase both the size and frequency of our breaths. By breathing more, our inhaled dose of air pollutants is increased, and this can lead to the potential for an increase in the negative effects of air pollution. Furthermore, during intense exercise, we tend to breathe more through our mouths and less through our nose. Our nose acts as a filter and humidifier, and thus during heavy exercise, we tend to bypass this natural filtration leading to more particles travelling deeper into the lungs, and having a greater chance of entering the blood circulation. Prolonged outdoor activities such as hikes and long bike rides, lead to a much larger inhaled dose than shorter activities, even if these shorter duration activities are more intense. So, when choosing a type of exercise, a short workout, even if it is more intense will lead to a smaller dose of pollutants than prolonged low intensity exercise. A well-fitted N95 respirator will significantly reduce the ingestion of particles (but not gases) at rest and during light exercise. However, for exercise that is moderate or high intensity, these respirators are generally not well tolerated. Alternatively, they may be useful for reducing pollution dose prior to and following exercise.



Indoor Exercise

To reduce exposure to wildfire smoke, individuals might consider indoor exercise as a safer alternative during a wildfire event. However, in British Columbia, air conditioning and air filtration are not universal, so outdoor air and air pollutants can readily penetrate indoors, and indoor concentrations can sometimes be comparable to outdoors. Thus the recommendation for indoor exercise during a wildfire event is to try to find an indoor environment with good quality filtration, to purchase an air purifier, or to make an inexpensive air cleaner with a box fan using the directions provided by the BCCDC.

Assessing Air Quality

One of the key factors for reducing air pollution risk during outdoor physical activity is choosing the right time and location for exercise. However, this can be challenging for active individuals since there are so many potential information sources (e.g. websites, apps, news bulletins, wearables), with often contradictory data. Furthermore, there are a number of different air quality scales presented to the consumer which can be confusing. In BC, we have the Air Quality Health Index (AQHI), which has been adapted to handle wildfire events. This is an excellent tool, that comes with outdoor exercise guidance, but it is not universally used on the apps and websites that consumers most often access, which can lead to confusion. Wearable monitors are also available and becoming increasingly popular, but some can be so unreliable as to be effectively useless. Fortunately, the EPA-affiliated Air Quality Sensor Performance Evaluation Center (AQ-SPEC) performs rigorous testing and maintains an up-to-date, freely accessible database of a significant number of wearable devices available on the market.

Sporting Events

When to cancel or postpone sporting events is a contentious issue because the body of evidence upon which the current policies are based is very limited. However, local sporting organizations are increasingly adopting their own air quality policies linked to the AQHI. This helps athletes and staff to plan ahead. For example, BC Athletics (track and field), Triathlon BC, Softball BC, and BC Soccer all have published policies. Event organizers are advised to publicize these policies in advance (e.g. during the event registration process) to permit participants to know what to expect in advance.

Summary and Recommendations

In summary, sports and physical activity are an important means to improve quality of life and to prevent and manage non-communicable disease. With increasing air quality warnings, individuals and organizations need to adopt a series of strategies to help people to stay active while reducing air pollution exposure as much as possible.

During sport and physical activity, our metabolic rate is increased, and that causes us to increase both the size and frequency of our breaths.

Air Quality in British Columbia

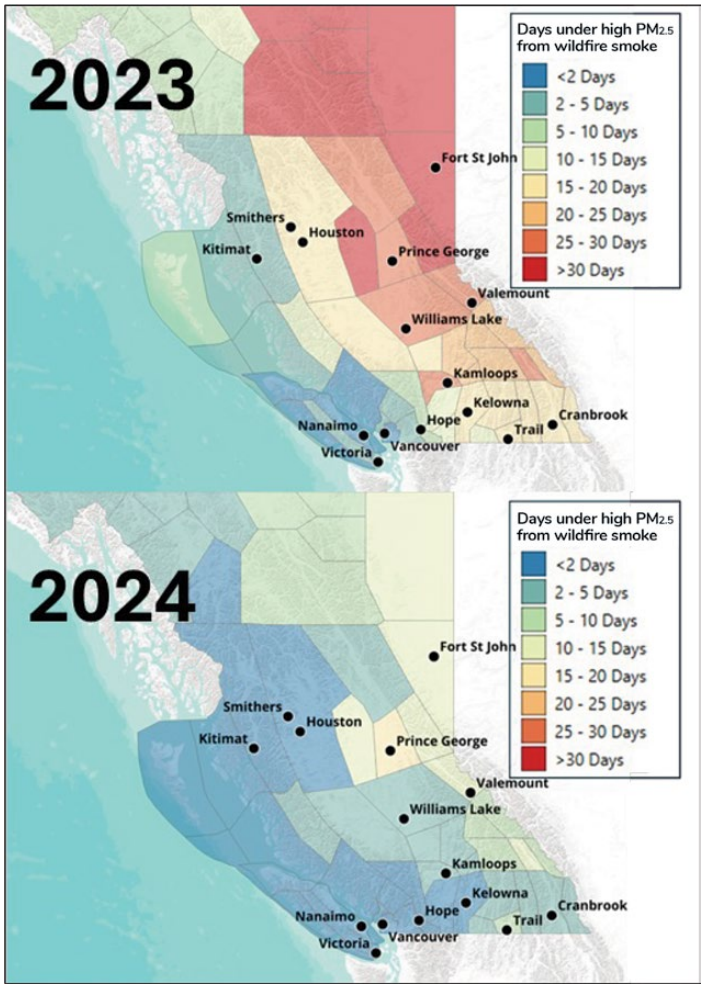
How Does BC Measure Up

The past two summers in British Columbia illustrate the growing intensity and threat of wildfire, including its impact on property, public safety, and air quality. In 2023, a record-breaking 2.8 million hectares of British Columbia's forest burned, damaging homes and structures, and resulting in the tragic loss of life for six members of the BC wildland firefighting community. The 2023 season was also alarmingly active in other parts of the country, including Alberta, the Northwest Territories, Quebec, and Nova Scotia. Overall, approximately 15 million hectares burned across Canada, impacting air quality in major urban areas such as Montreal, Toronto, and even as far away as New York City. In BC, communities in the northeast endured more than 30 days of unhealthy levels of fine particulate matter that exceeded provincial air quality standards.[1]

While more modest compared to 2023, the 2024 wildfire season remains the 4th most active in BC in terms of land area burnt. There were remnants of the 2023 wildfires that propagated through the 2024 season, and there was also the massive destruction from the wildfires in Jasper, Alberta.

Models of future climate predict warmer and drier summers in Western Canada, which has the potential to increase the severity and intensity of these wildfires. The scale and intensity of the 2023 wildfires in North America were globally significant, with estimates suggesting that these were among the largest contributor to global CO_2 emissions in 2023, higher than human emissions from any country except China, the USA, and India.[2]

In the following sections, air quality data collected in 2023 and 2024 are summarized and compared against provincial or national objectives. Data from all available monitoring sites, except temporary mobile sites and industrial fenceline sites, are summarized in the Technical Appendix.



$PM_{2.5}$ Fine Particulate Matter

Fine particulate matter ($PM_{2.5}$)—tiny particles smaller than 2.5 micrometres—are estimated to contribute to the premature deaths of around 1,900 British Columbians each year. These particles penetrate deep into the lungs, causing immediate harm such as airway irritation and long-term damage such as heart and lung diseases[3].

There were 55 monitoring sites across BC that measured and reported hourly concentrations of $PM_{2.5}$ for all or most

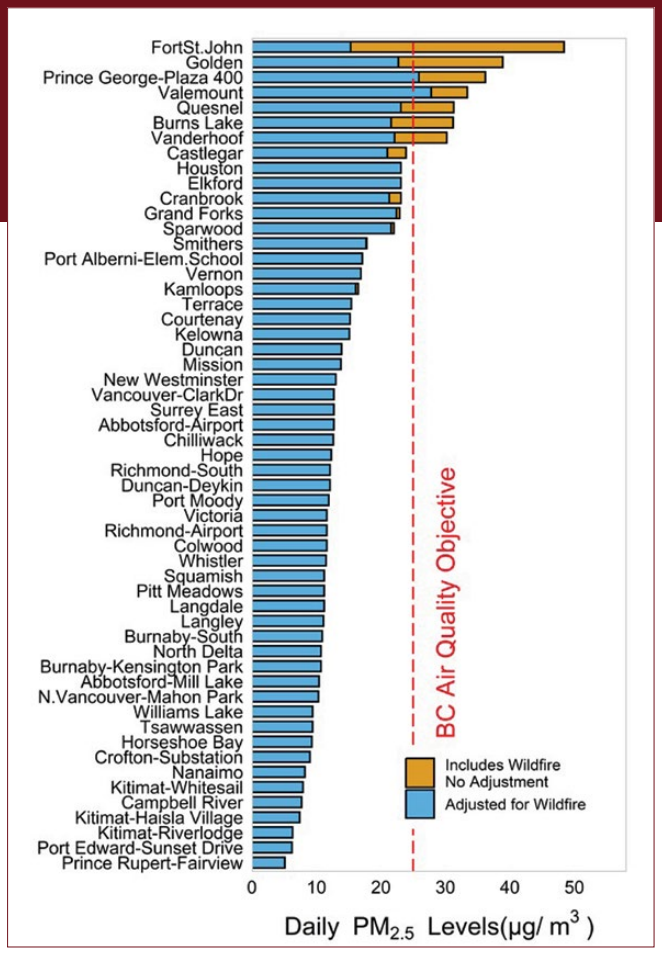
1 Based on the Provincial Daily Air Quality Objective for PM2.5 of 25µg/m³.

2 Byrne, B., Liu, J., Bowman, K.W. et al. Carbon emissions from the 2023 Canadian wildfires. Nature 633, 835–839 (2024). https://doi.org/10.1038/s41586-024-07878-z

3 Health Canada. (2024). Health Impacts of Air Pollution in Canada in 2018: 2024 Report. ISBN: 978-0-660-69855-7.

of 2024. These stations recorded hourly concentrations, from which daily and annual levels for 2024 can be calculated. Daily $PM_{2.5}$ levels are calculated from hourly data using the 98th percentile of 24-hour averaged values. In BC, the daily 98th percentile levels ranged from 5.1 µg/m³ at Prince Rupert-Fairview to 48.4 µg/m³ at Fort St. John.

There were seven monitoring sites that reported levels of $PM_{2.5}$ that exceeded the provincial daily objective of 25 µg/m³. When the influence from the wildfire is removed, the provincial air quality objectives are met, except at Prince George and Valemount.



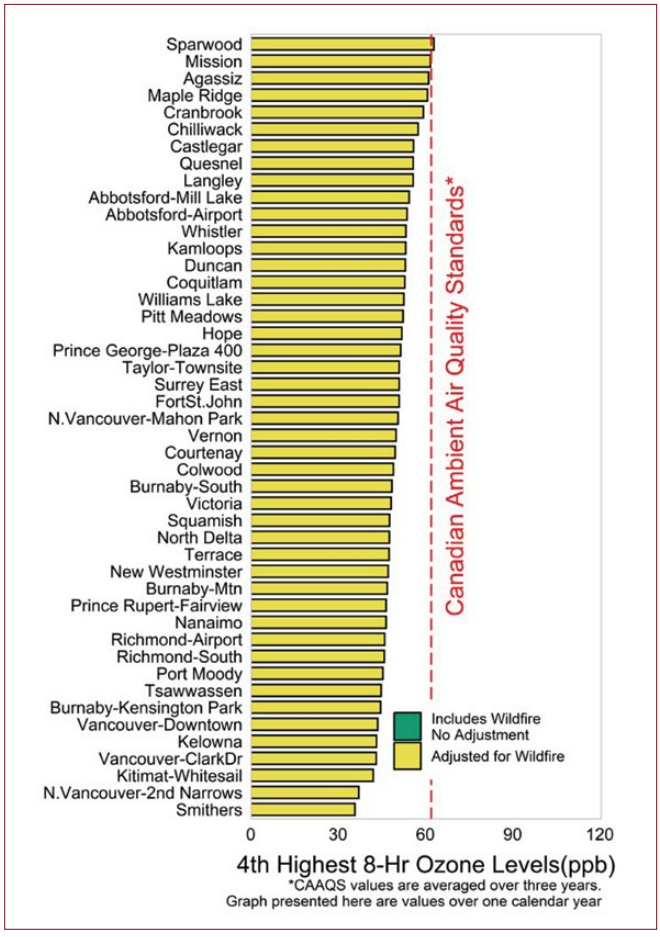
Ground-level Ozone

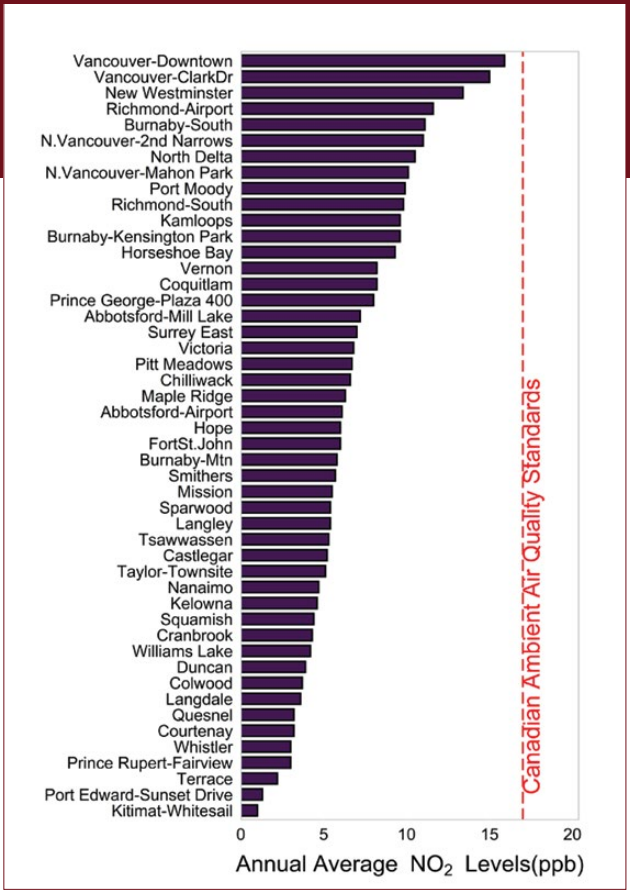
Ground-level ozone is an air pollutant produced just above the Earth's surface through complex chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. In British Columbia, NOx is primarily emitted by the transportation sector and industrial activities, primarily during fossil fuel combustion. VOCs are released from various sources such as incomplete fuel combustion, industrial process and equipment leaks, residential wood burning, and the evaporation of fuels and solvents.

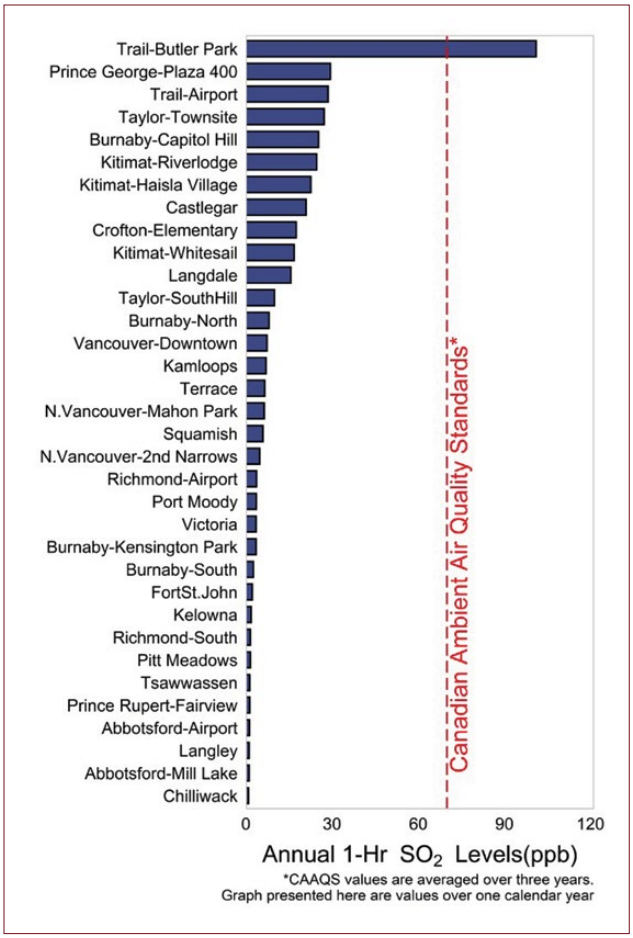
Unlike the ozone layer in the stratosphere, which protects life on Earth by absorbing harmful ultraviolet radiation, ground-level ozone is a pollutant that poses serious risks to human health. Short-term exposure can cause breathing difficulties, increase frequency of asthma attacks, aggravate other lung diseases such as emphysema and inflammation, and can even result in premature death. There is also evidence that long-term exposures can cause the development of respiratory problems such as COPD and asthma.

Ozone is also a major component of one of the most dangerous air quality conditions called photochemical or summertime smog. This type of smog occurs primarily in urban areas whenever ozone levels increase and combines with other pollutants under favorable sunlight and weather.

In 2024, ground-level ozone was monitored at 47 sites across the province. Annual concentrations, based on the 4th highest 8-hour value, ranged from 35.8 ppb in Smithers to 62.9 ppb in Sparwood. The modest wildfire season, particularly in terms of smoke impact in the Lower Fraser Valley, and more favourable weather conditions resulted in lower ground level ozone compared to previous years.







NO_2 Nitrogen Dioxide

Nitrogen dioxide (NO_2) is one of the air pollutants in the class known as nitrogen oxides (NOx), which are released as by-products of high-temperature combustion. The largest sources of NOx in BC are the transportation sector and the upstream oil and gas industry. Both sectors rely on the combustion of fossil fuels to operate engines for propulsion or to maintain industrial operations.

Short-term exposures to NO_2 are linked to respiratory illnesses such as asthma and airway inflammation. There is also strong evidence of long-term effects, such as increasing the frequency of asthma attacks in adults and reducing the lung function in growing children.

There were more than 50 sites that reported NO_2 levels for at least part of 2024. Based on the annual average concentration, NO_2 levels range from 1.0 ppb at Kitimat-Whitesail to 15.9 ppb at Vancouver-Downtown. All sites in BC were below the 17-ppb, a level defined by Canadian Ambient Air Quality Standards. The highest annual levels were observed in urban areas and near roadside locations, emphasizing the significance of vehicular transportation as a major source of emissions.

SO_2 Sulphur Dioxide

Sulphur dioxide (SO_2) is a colourless, highly reactive gas best known for its contribution to the formation of acid rain. SO_2 is primarily an industrial pollutant, with major sources in the upstream oil and gas industry, diesel vehicles, ore and mineral smelting facilities, the pulp and paper sector, and marine vessels.

Short-term exposure to SO_2 is known to aggravate asthma and increase respiratory symptoms. In various health studies and exposure guidelines, short-term health impacts were observed from 10-minute exposures to very high SO_2 concentrations.

In 2024, SO_2 was monitored at 35 BC sites, excluding mobile and industrial fenceline facilities. SO_2 levels, based on the 1-hour metric, ranged from 0.8 ppb at Chilliwack to 101.0 ppb at Trail-Butler Park. All sites, except Trail, reported much lower levels of SO_2 than the short-term (1-hour) benchmark value set by the Canadian Ambient Air Quality Standards (CAAQS).

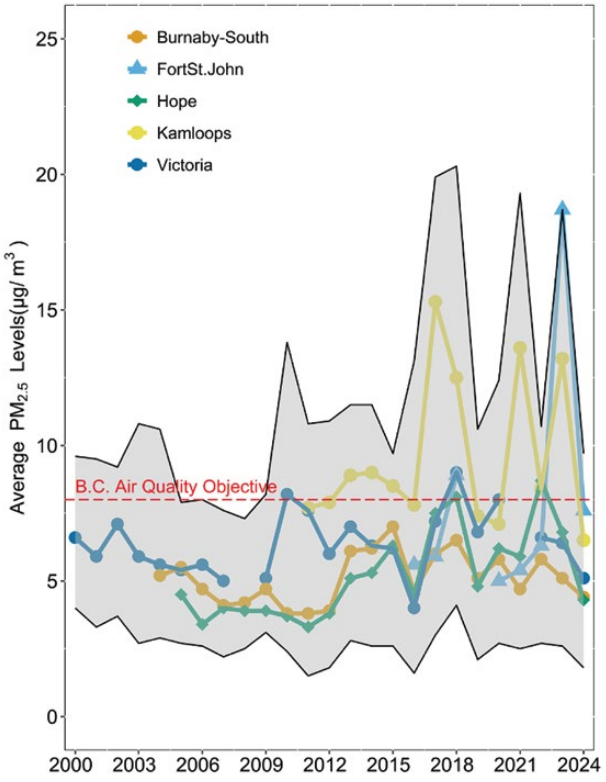
Trends

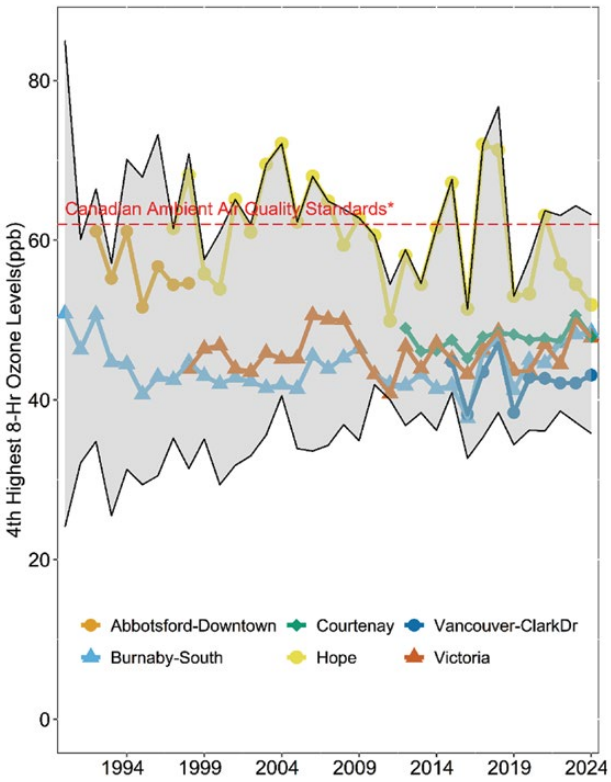
Air Pollution in BC Through the Years

Trends in air pollution levels help us understand historical changes in emission sources, the effects of policy changes, and evaluate collective actions taken to improve air quality. They also allow us to compare different areas and identify specific pollution hot spots that require more attention. The following figures show annual pollutant levels measured in BC over the past 20–30 years. Each graph displays the annual pollution levels in selected communities, overlaid on a graph showing both the lowest and highest levels measured at all monitoring stations across the province.

Over the past decade, wildfire smoke is emerging as a leading source of $PM_{2.5}$ pollution in British Columbia. The annual average $PM_{2.5}$ levels show significant spikes in years with major wildfire events, including the record-breaking fires of 2017 and 2018, the 2021 wildfires, and the unprecedented fires of 2023. As climate change intensifies, wildfires are projected to increase in frequency and severity, leading to an expected increase in wildfire smoke and $PM_{2.5}$ levels[4].

Wildfires can also influence the trends of pollution from ground-level ozone. Wildfire smoke contains ozone-forming components that can be transported across vast distances. When these components react with sunlight, they can have widespread impact by contributing to ground-level ozone formation. The severe wildfires of 2017 and 2018 transported smoke hundred of kilometers away from BC's interior into the Lower Fraser Valley, resulting in levels exceeding the national standard of 65 parts per billion (ppb). Long-range transport of wildfire smoke from fires as far away as Siberia also contributed to these high ozone levels[5]. Extreme heat events, including the heat dome of 2021, can also influence ozone levels by producing the warm and





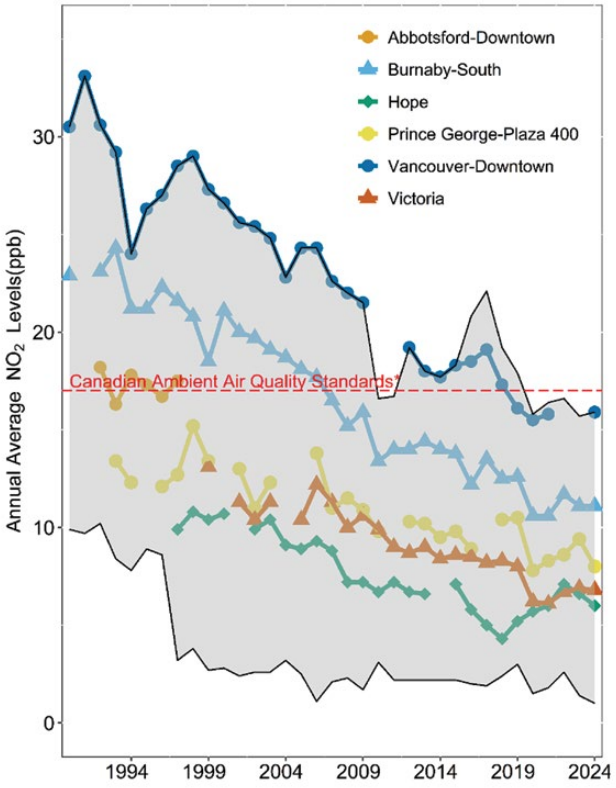
4 Carlsten, C., Brauer, M., Camp, P. G., Nesbitt, L., & Turner, J. (2023). *British Columbia, Canada, as a bellwether for climate-driven respiratory and allergic disorders. Journal of Allergy and Clinical Immunology.* https://doi.org/10.1016/j.jaci.2023.09.012.

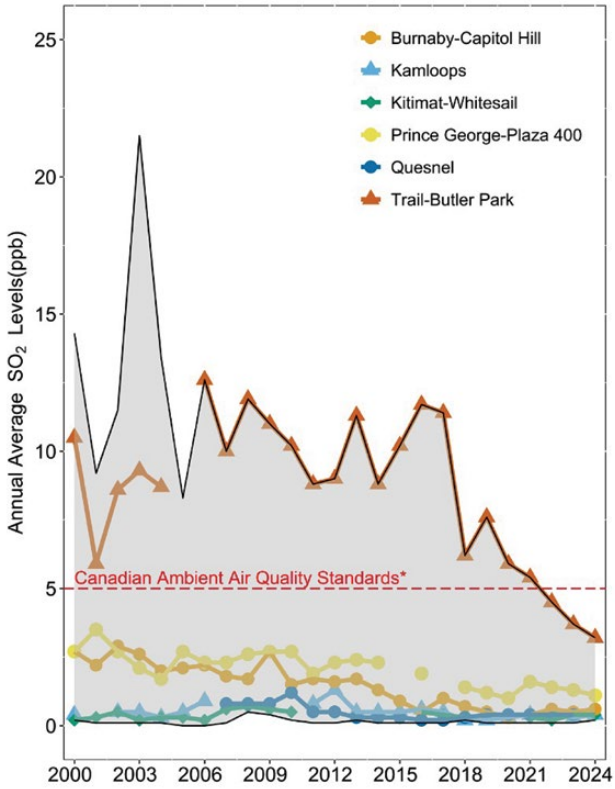
5 NASA (2021). *Smoke from Siberian Fires Reaches Canada.* Retrieved from https://www.nasa.gov/image-article/smoke-from-siberian-fires-reaches-canada/

stable conditions that favour ozone formation. Progressive actions to reduce the release of ozone-forming chemicals, such as improved vehicle and fuel standards to lower volatile organic compounds and nitrogen oxides emissions, have been effective at reducing ozone levels over the years. However, the impact of climate change, including rising summer temperatures and the increasing severity of wildfires, introduce uncertainties regarding future ozone levels, potentially offsetting the progress made in previous years.

NO_2 levels (shown as annual averages) have generally decreased over the past three decades largely due to more stringent vehicle emission and gasoline standards, better emission control technology in new engines and industrial equipment, and from local actions such as promoting public transportation, and anti-idling policies. Current initiatives towards lower and even zero emission vehicles are expected to further reduce NO_2 levels over the next decade. Significant reductions in NO_2 levels were observed in several urban areas during the 2020 COVID-19 pandemic, primarily due to the decrease in vehicular traffic.

SO_2 levels (in terms of annual averages) have been decreasing over the past decade and have remained low in most areas, well below the 5 parts per billion (ppb) set by the Canadian Ambient Air Quality Standards (CAAQS). This reflects efforts to reduce sulphur emissions from diesel trucks, marine vessels, and industries such as petroleum refining, pulp and paper, metal smelting, electricity generation, and cement production. The highest SO_2 levels in BC are observed in Trail. Although SO_2 levels measured in Trail recently achieved the CAAQS based on annual averages, the area still experiences short durations of very high SO_2 levels. Trail is considered a hotspot for SO_2 pollution and was the Canadian city with the highest SO_2 level in 2019.[6]





6 Environment and Climate Change Canada (2019). Sulphur dioxide (SO_2) emissions. Retrieved from https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/tools-resources-data/sulphur-dioxide.html.

Updates
from Partner Agencies

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Environment and Climate Change Canada works with federal partners, provinces and territories to improve air quality and reduce negative impacts on human health and the environment; and to provide authoritative forecasts, warnings, data, and information services related to weather and air quality conditions to help Canadians make informed decisions about health, safety, and economic prosperity. Some highlights of this work undertaken over the last year are presented below.

Updates to Air Quality Model and WeatherCan App

In 2024 Environment and Climate Change Canada (ECCC) merged two operational air quality forecast models into a single air quality prediction system, the Regional Air Quality Deterministic Prediction System (RAQDPS). Previously emissions from wildfire smoke were processed in a separate model, whereas the new RAQDPS combines all emission sources. More information about ECCC's air quality model, including maps showing predicted concentrations of $PM_{2.5}$, ozone and nitrogen dioxide for the next 72 hours, is available here: ***Air quality and weather - Canada.ca***

ECCC's WeatherCAN app was also updated in 2024, with significant improvements, including a new look, easier navigation, more prominent air quality information, and the ability to customize temperature alerts to user needs. More information is available here: ***WeatherCAN - Canada.ca***

Regional Applied Science Initiatives for Smoke

ECCC completed a 5 year Low-Cost PM Sensor Pilot Project in 2024, which assessed the value of using sensors to enhance air quality prediction and services during high impact events, such as forest fires. The project focused primarily on $PM_{2.5}$ sensors and their value in providing additional surface observations in areas not covered by traditional monitoring networks. Key elements of the project included side by side intercomparisons with traditional monitors, deployments in select rural communities, developing bias correction factors, and a map-based dissemination platform. The project demonstrated the potential value of this technology for providing enhanced real-time air quality information, improving air quality forecasting and engaging in outreach and education. Next steps for the project include determining the requirements to continue to make use of this alternative data source on a long-term basis.

Above: Low-cost sensors, such as the above, can provide immediate information on air quality and other environmental factors.

ECCC has completed the development of a national gridded Ventilation Index forecast, which can be used to estimate how well the atmosphere will disperse smoke from controlled burning on any given day. This new ventilation index, which ranges from 0, indicating the worst ventilation, to 100, indicating the best ventilation, is now available through ECCC dissemination channels ***(MSC DataMart, MSC AniMet)***.

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Santé Canada Health Canada

Health Canada works with Environment and Climate Change Canada, provinces, territories, municipalities, Indigenous partners and other community-based stakeholders to improve air quality through regulations, standards, guidelines, guidance, outreach, and public information. Some highlights of the last two years are presented below.

Wildfire Smoke

Health Canada is leading the federal government Health Portfolio's wildfire preparedness and response activities related to wildfire smoke and air quality, heat, and mental health impacts.

Health Canada has developed or updated a variety of public health resources for wildfire smoke. Since 2023, Health Canada participated in over 70 national and regional media interviews, provided air quality and health protective advice and provided air quality monitoring support to the provinces and territories.

In May 2024, Health Canada published a concise weight-of-evidence review of health effects associated with exposure to wildfire smoke entitled ***Human health effects of wildfire smoke.*** Factsheets, infographics, and public health advice on wildfire smoke, air quality, heat, health impacts, health protective measures and mental health impacts were also updated in collaboration with Environment and Climate Change Canada and the Public Health Agency of Canada and shared with partners in other federal government departments, provincial, territorial, municipal and Indigenous partners, public health partners and other stakeholders. These resources, including Health Canada's Guidance for cleaner air spaces during wildfire smoke events, are available on ***canada.ca/wildfiresmoke.*** Health Canada also provides information and advice to people in Canada via social media posts.

Health Canada supported and contributed to a British Columbia Centre for Disease Control study of wildfire smoke infiltration into 45 childcare facilities. The authors concluded that on-site sensors can potentially help facility managers make real-time decisions to take actions to improve indoor air quality. This study has been published in Environmental Research: Health ***(Lee et al., 2024)*** *https://doi.org/10.1088/2752-5309/ad1fd6*

Air Pollution Health Impacts

Dr. David Stieb of Health Canada was the lead author on a paper of significance to the discussion of environmental racism and environmental injustice. The paper, ***Inequality in the distribution of air pollution attributable mortality within Canadian cities*** was published in GeoHealth in August 2023. The study of seven Canadian cities found that neighborhoods with a higher prevalence of low income and Indigenous identity had significantly higher air pollution attributable mortality. Inequalities in baseline health status, such as baseline mortality rates, were a larger driver than inequalities in exposure to air pollution in this study. On his retirement, we celebrate Dr. Stieb's career and his contributions to air quality health science.

The report ***Health impacts of air pollution in Canada in 2018*** was published in March 2024. This edition updates estimates of the air pollution health burden. Exposure to air pollution from $PM_{2.5}$, O_3 and NO_2 contributed to 17,400 premature deaths in Canada in 2018, equal to 47 premature deaths per 100,000 people. Non-fatal health outcomes that can be attributed to air pollution included 35 million acute respiratory symptom days, 2.7 million asthma symptom days and 8,100 emergency room visits annually. The monetized value of adverse air pollution health impacts is $146 billion (2020 CAD) in 2018.

A paper by the same group, ***Fuller-Thomson et al., (2024)***, found that between 2001 and 2021, despite

improvements in air quality, a larger and more vulnerable Canadian population experienced a small net increase in mortality attributable to $PM_{2.5}$.

Health Based Air Quality Objectives

Health Canada is in the process of developing short-term and long-term Health-Based Air Quality Objectives (HBAQOs) for the first cycle of prioritized ambient air pollutants. These pollutants are arsenic, benzene, carbon monoxide, formaldehyde and PM_{10} (particulate matter with a diameter of 10 microns and smaller). HBAQOs represent safe levels of exposure that consider health risks only, and that can be used voluntarily by all levels of government and air partners in managing air quality. They are distinct from Canadian Ambient Air Quality Standards (CAAQS), which are commitments to continuously improve air quality.

Transboundary Air Pollution

In support of the 2023 Review and assessment of the Canada-U.S. Air Quality Agreement (AQA) prepared by the two countries, Health Canada and Environment and Climate Change Canada quantified the health impacts of transboundary particulate matter ($PM_{2.5}$) and ground level ozone (O_3) air pollution across Canada and published the paper ***Attribution of Fine Particulate Matter and Ozone Health Impacts in Canada to Domestic and US Emission Sources.*** The study suggests that substantial benefits could be gained by

domestic and international strategies to reduce $PM_{2.5}$ in the Canada-US transboundary region.

Indoor Air Quality

In September 2023, Health Canada published the ***Proposed Residential Indoor Air Quality Guidelines for Benzene*** for consultation. The proposed guidelines recommend various ways to reduce exposure to benzene in the indoor environment and proposes a long-term exposure limit for benzene in residential indoor air, which would minimize risks to human health. Future progress on this file will include careful consideration of implications to cross-cutting benzene-related issues.

In 2024, Health Canada updated ***Indoor Air Reference Levels (IARLs)*** for 25 different volatile organic compounds (VOCs). IARLs are health-based screening values for VOCs that are not addressed by Residential Indoor Air Quality Guidelines and may be used to support risk assessment, risk management and research needs of Health Canada and its partners and stakeholders.

Two indoor air guidance documents are currently being finalized. ***The Guidance for Improving Indoor Air Quality in Office Buildings*** summarizes ways to remediate, maintain and improve indoor air quality in office buildings, and is an update of a 1995 document of similar scope. In addition, the Guidance for Indoor Air Quality Professionals provides information on the health effects of specific air contaminants, and on air sampling and monitoring.

Indoor environmental quality data are needed to better serve disproportionally impacted communities, reduce health inequities and protect public health. However, data from subsidized housing is extremely limited, reducing our capacity to protect residents from growing threats such as wildfire smoke and heat stress, as well as indoor sources of pollution. Health Canada is conducting the Subsidized Housing Multi-Unit Residential Building study in Metro Vancouver from 2024 to 2027, which will collect data in units in subsidized housing, and leverage citizen science engagement and low-cost sensors to continuously monitor indoor air quality across a range of situations such as heat events and wildfire smoke exposure.

Fraser Valley Regional District

Do-It-Yourself Air Cleaner Workshops

The Fraser Valley Regional District (FVRD) partnered with Simon Fraser University and the BC Lung Foundation to provide “Do-it-Yourself” air cleaner workshops throughout the Fraser Valley. Community members were invited to build a home air cleaner using a box fan and filter to reduce the concentrations of particulate matter in their home. These workshops helped promote community engagement and awareness of indoor air quality, especially as it pertains to the effects of wildfire smoke exposure.

Above: DIY Air Cleaner - "Cardboard Shroud" - Dr. Vahid Hosseini, SFU Sustainable Energy Engineering Collaborator

Above: DIY Air Cleaner - "Tape Shroud" - David Hunt, 312 Main, Community Partner

Community Radon Testing

The FVRD completed the 3rd year of a radon awareness and testing campaign. Partnering with Take Action on Radon, the BC Lung Foundation, and other community partners, the FVRD distributed radon testing kits throughout the Fraser Valley. The testing results continue to support radon understanding and awareness efforts and are used to assess community risk, reduce overall community radon exposure, and help advocate for further action.

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metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Air Quality Warnings Help Residents Stay Informed and Safe

When air quality becomes degraded, Metro Vancouver issues air quality warnings to help protect public health and inform residents of changing conditions and how they can protect themselves. In 2025, the name "air quality advisory" will change to "air quality warning", aligning with provincial and federal partners to improve public understanding. Wildfire smoke warnings in seven of the last ten summers and elevated ground-level ozone due to extreme heat waves emphasize how climate change is affecting air quality. Metro Vancouver's air quality warning service is for the entire Lower Fraser Valley airshed, including Metro Vancouver and the Fraser Valley Regional District. Real-time air quality data is available at ***www.airmap***.ca. For information on wildfire smoke preparation, visit ***Wildfire Smoke and Air Quality***.

Reduce Wood Smoke Emissions for a Healthier Community

Wood smoke from residential indoor burning is a major source of health-harming air pollutants in the Metro Vancouver region. Residents who operate an indoor wood-burning device must declare that they use best burning practices, and in urban areas must register their fireplace, wood stove, or pellet stove. Use of residential indoor wood-burning devices is also prohibited from May 15 to September 15 each year in Metro Vancouver. After September 15, 2025, burning wood in fireplaces will not be permitted in urban areas, with some exceptions such as during emergencies. Residents can learn more about the requirements for best burning practices and how to register wood-burning fireplaces, wood stoves, and other wood burning devices online through Metro Vancouver's ***Residential Indoor Wood Burning System***.

Rebates for Switching from Wood-Burning Appliances to Heat Pumps

Staying cool in the summer heat saves lives. The CleanBC Energy Savings Program helps residents save up to $24,500 off the cost of a heat pump installation, depending on criteria such as household income. Metro Vancouver offers a further rebate, funded by the Province, of $1,500 to $3,000 for residents to replace an old wood-burning appliance with an electric heat pump, which can provide emissions-free heating and cooling. To learn more and apply, visit ***Community Wood Smoke Reduction Program***, or visit ***Provincial Rebate***.

BC Retrofit Accelerator to Boost Building Energy Efficiency

Building owners, managers, and strata councils across the Metro Vancouver region can now access expert advice and support from the BC Retrofit Accelerator to navigate climate and energy upgrades. Metro Vancouver supports this initiative through its Sustainability Innovation Fund — along with other public, private, and non-profit partners — and the accelerator aligns with BC Hydro programs like the new ***Multi-Unit Residential Building Retrofit Program***. To apply, visit ***BC Retrofit Accelerator***.

Climate Action Dialogues

Metro Vancouver's ***Climate 2050*** strategy aims to improve resilience to climate change impacts and reduce GHG emissions in the region (targeting 45% by 2030 and net zero by 2050). To build collaboration in tackling this critical challenge, Metro Vancouver hosts the Climate Action Dialogues, a series of public conversations on climate action in the region. In 2023 and 2024, Metro Vancouver hosted dialogues on human health and well-being, transportation, and buildings. Additional dialogues on regional climate resilience are taking place in spring 2025. For more, visit ***Climate Action Dialogues***.

Climate Literacy Online Learning Tool

Metro Vancouver's Climate Literacy helps residents to explore locally relevant information about climate change at their own pace, and discover examples of what we are doing, and can do, to reduce emissions and prepare our communities for climate change impacts. For more, visit ***Climate Literacy***.

Reducing Emissions from Motorized Garden Tools

In Metro Vancouver, small gas-powered equipment like lawn mowers and leaf blowers emit about half as much health-harming air pollutants as all the region's cars and trucks combined (nearly 1.5 million vehicles). In 2024 and 2025, Metro Vancouver engaged with communities and businesses to develop a strategy to accelerate the transition to emissions-free equipment. To learn more and stay informed on this initiative, visit ***Reducing Emissions from Small Gas-Powered Equipment***.

Reducing the Impact of Emissions of Nitrogen Oxides from Boilers and Process Heaters

Metro Vancouver is considering amendments to its ***Boilers and Process Heaters Emission Regulation***, which regulates the discharge of air contaminants such as nitrogen oxides from boilers and process heaters in buildings and some industrial facilities in the Metro Vancouver region. Because regional air

quality objectives for nitrogen dioxide (NO_2) became more stringent in early 2025, the proposed amendments intend to protect people from exposure to NO_2 through improved combustion technology, emission stack design, and dispersion modelling for facilities with the greatest potential impact on neighbouring communities. To learn more and stay informed, visit ***Reducing Health-Harming Emissions from Boilers and Process Heaters***.

Air Quality and Climate Action

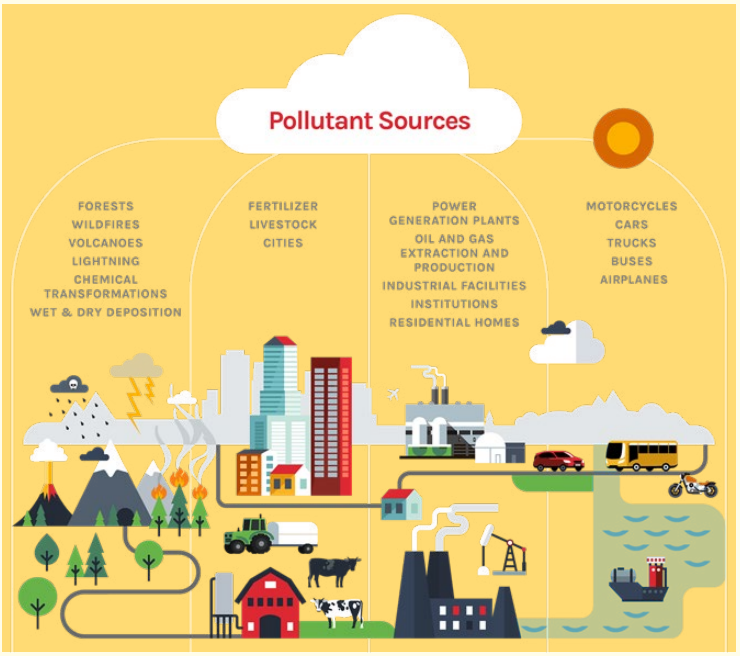
Subscribe to receive updates on air quality and consultation on regional air quality and climate action initiatives at ***https://metrovancouver.org/services/air-quality-climate-action/mailing-list.***

BRITISH COLUMBIA | Ministry of Environment and Parks

Jurisdictional Update

The provincial Community Wood Smoke Reduction Program (CWSRP), will start its 2025 season following applications from communities, non-government organizations, and First Nations. Started in 2008, the CWSRP is a partnership between BC Lung and the Ministry of Environment and Parks with the goal of improving air quality by encouraging the exchange of old wood-burning appliances for cleaner alternatives as well as other initiatives to reduce wood smoke. Several updates were introduced recently, including more incentives for communities with high levels of fine particulate matter ($PM_{2.5}$) and additional incentives for switching to heat pumps. Other changes include simplifying the application process for First Nations and leveraging experienced coordinators to assist new applicants.

The 2019-2021 Air Zone Report was published in September 2024. The report summarizes the status of air quality in broad areas of the province called air zones and defines management actions recommended under a national comprehensive system called the Air Quality Management System (AQMS). The report highlights the impacts of wildfires in causing exceedances of the national standards for fine particulate matter in the Lower Fraser Valley and Georgia Strait Air Zones, two of the most populated air zones in the province. Several communities in the central and southern interior air zones also exceeded the standards, though in this case the exceedances were due to local emissions, although greatly exacerbated by wildfire smoke. For more information on the Air Zone Report, please visit: ***www.gov.bc.ca/airzonereports***.



Left image source: https://www.ccme.ca/en/air-quality-report

A report summarizing the results of measurements from low-cost sensors in the town of Smithers and the Bulkley Valley Lakes District has been published. The report provides a clearer understanding of the variations in levels of $PM_{2.5}$ across Smithers. It found high concentrations during the winter and summer periods and identified specific hotspots. Recommendations to address air quality issues, provided by the Ministry to the Bulkley Valley Lakes District airshed group, are formulated in the report. For details, please visit: ***https://shorturl.at/vZVNq***.

The District of Vanderhoof has passed the Solid Fuel Burning Control Bylaw, which came into effect on July 1, 2024. This bylaw mandates that all solid fuel burning appliances, including fireplaces and woodstoves, must comply with Canadian or US certification standards. Non-compliant appliances must either be replaced, removed, or permanently disabled. Furthermore, property transactions (e.g., sales) involving uncertified appliances are halted until compliance is achieved. Continued operation of uncertified appliances beyond the stipulated deadline will constitute a violation of this bylaw. This regulatory action represents a significant step toward improving air quality and ensuring public health in Vanderhoof since the district has had levels of fine particulate matter exceeding the national standards.

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ENVIRONMENT AND CLIMATE CHANGE CANADA
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ISLAND HEALTH AUTHORITY
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1952 Bay St, Victoria, B.C. V8R 1J8
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VANCOUVER COASTAL HEALTH AUTHORITY
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FRASER HEALTH AUTHORITY
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