Occupational Health Clinics for Ontario Workers

Centre de Santé des Travailleurs(ses) de l'Ontario

Submission to the

Ontario Ministry of Labour, Immigration, Training, Skills, and Development

regarding the

Poor Outdoor Air Quality and Workplace Health and Safety Consultation

Occupational Health Clinics for Ontario Workers

September 18, 2023

OHCOW SUBMISSION RE: POOR OUTDOOR AIR QUALITY AND WORKPLACE HEALTH AND SAFETY CONSULTATION

Introduction: We thank the Ontario Ministry of Labour, Immigration, Training, Skills, and Development (MLITSD or Ministry) for the opportunity to respond to the "Poor Outdoor Air Quality And Workplace Health And Safety Consultation". As per our mandate, the Occupational Health Clinics for Ontario Workers (OHCOW) strives to prevent occupational disease by primary, secondary and tertiary prevention (preventing harmful exposures, screening for early signs of occupational disease and recognizing cases of work-related disease). Therefore, we submit the following response to the Ministry's invitation.

The Occupational Health Clinics for Ontario Workers Inc. (OHCOW) is a team of health professionals committed to promoting the highest degree of physical, mental, and social well-being for workers at work. At seven clinics in Ontario, a team of nurses, occupational hygienists, ergonomists, and physicians see Ontario workers to identify work-related illness and injuries, promote awareness of health and safety issues, and develop prevention strategies. First established in 1989, the clinics have seen thousands of individual patients and visited hundreds of workplaces helping to identify unhealthy and unsafe conditions and providing advice to workplace parties on the prevention of occupational diseases. With respect to wildfire smoke, OHCOW deals directly with Joint Health and Safety Committees (JHSCs), Health and Safety Reps, unions, employers, individual workers, and others, answering questions and providing prevention advice.

Health Impact of $PM_{2.5}$ (particulate matter 2.5 µm): As OHCOW occupational hygienists we have followed closely the research developments in outdoor air exposures to $PM_{2.5}$ (particulate matter with a mean aerodynamic diameter of 2.5 micrometers (µm)). In particular, the recently published MAPLE research report (https://www.healtheffects.org/publication/mortality-air-pollution-associations-low-exposure-environments-maple-phase-2), which analyzed the health responses of 7,100,000 Canadians to $PM_{2.5}$ levels over the years 1981 to 2016. The authors of this definitive study found that:

> "• Long-term outdoor $PM_{2.5}$ exposures as low as 2.5 µg/m^3 were associated with increased risk of death, with variation across different geographical regions and with smaller effects when adjusted for ozone concentrations.
>
> • This study identified associations with health effects at $PM_{2.5}$ concentrations below the current U.S. ambient air quality standard of 12 µg/m^3, suggesting that lowering the standard could yield further health benefits."

Canadian Ambient Air Quality Standard (CAAQS) for $PM_{2.5}$ is 8.8 µg/m^3 as a 3-year average of the annual average of the daily 24-hour average concentrations. There is also a single day (24-hour) criterion of 27 µg/m^3. The following is an excerpt of the table found at: https://ccme.ca/en/air-quality-report

Air quality management levels	Management Levels for Fine Particulate Matter CAAQS			
	24-hour (micrograms per cubic metre)		Annual (micrograms per cubic metre)	
	2015	2020	2015	2020
Red	>28	>27	>10.0	>8.8
Orange	20 to 28	20 to 27	6.5 to 10.0	6.5 to 8.8
Yellow	11 to 19		4.1 to 6.4	
Green	≤10		≤4.0	

During the smoke episodes in June, the 24-hr concentrations of $PM_{2.5}$ reached 211 µg/m^3 at the Ottawa downtown monitoring station (June 7, 2023); 97 µg/m^3 at Toronto West (June 28, 2023); and 145 µg/m^3 at Windsor downtown (June 28, 2023). These levels are clearly in excess of the CAAQS Management Levels.

The **AQHI (Air Quality Health Index)** is a Canadian innovation designed by a group from Health Canada (*David M. Stieb, Richard T. Burnett, Marc Smith-Doiron, Orly Brion, Hwashin Hyun Shin & Vanita Economou (2008) A New Multipollutant, No-Threshold Air Quality Health Index Based on Short-Term Associations Observed in Daily Time-Series Analyses, Journal of the Air & Waste Management Association, 58:3, 435-450, DOI:10.3155/1047-3289.58.3.435*). Over the summer OHCOW sponsored an educational webinar during which one of the chief architects of the system spoke about its use and validation ("Where there's smoke…" Understanding Particulate Hazards Indoors and Out (July 21, 2023) https://www.ohcow.on.ca/posts/where-theres-smoke/).

Also highlighted during the webinar was a tool that estimates the human health impacts of changes to the ambient air quality. This tool was applied to the experience of wildfire smoke episodes over the years 2013-2015 and 2017 & 2018 (*C.J. Matz et al., "Health impact analysis of PM2.5 from wildfire smoke in Canada (2013–2015, 2017–2018)" Science of the Total Environment 725 (2020) 138506*). They concluded:

- "Hundreds to thousands of premature deaths per year attributable to wildfire-$PM_{2.5}$.
- Mortality and morbidity health impacts had an economic value of billions of CDN$.
- Health impacts greatest in populations in close proximity to the wildfire activity.
- Population at distance also impacted due to long-range transport of wildfire-$PM_{2.5}$."

Also mentioned during the webinar was the existence of a modified version of the AQHI to address wildfire smoke issues. In a relatively recently published article in the Canadian Journal of Public Health ("*Assessment of the Air Quality Health Index (AQHI) and four alternate AQHI-Plus amendments for wildfire seasons in British Columbia", Canadian Journal of Public Health 111:96-106 (2020)*) the authors recommended a modified version of the AQHI specifically designed to reflect the impacts of wildfire smoke.

Using the **modified version of the AQHI** the following table was created show the concentrations of wildfire smoke PM2.5 and the corresponding modified AQHI values:

$PM_{2.5}$ ($\mu g/m^3$)	1-hr $PM_{2.5\ Only}$ AQHI
14	1
24	2
27	3
34	3
35	4
45	5
55	6
65	7
75	8
85	9
95	10
105	11

This would provide an easy framework for understanding the impact of the hourly environmental $PM_{2.5}$ concentrations from wildfire smoke. **Ontario should adopt wildfire smoke modified version of the AQHI during smoke episodes** (similar to British Columbia and Alberta).

The Health Impact of Wildfire Smoke on Indoor Workers: The effect of climate change on the current and future experience of air quality inhaled by Ontario workers is well documented in the Ontario Provincial Climate Change Impact Assessment (OPCCIA) Technical Report. The report states:

> "In addition to outdoor air quality, climate change can also impact indoor air quality, leading to adverse health impacts (highlighted within the Infrastructure Area of Focus). Smoke from wildland fire is estimated health impacts of $5B to $21B annually in Canada ($190 million in the GTA alone). With the expected increase in wildland fire, this will be a significant impact on health (Matz et al., 2020)." (*p.449 Ontario Provincial Climate Change Impact Assessment Technical Report, January 2023*)

We would thus like to bring to the Ministry's attention that outdoor particulate also affects indoor workers given the HVAC systems are designed specifically to take in outdoor air and distribute it throughout the workplace. Thus, if the HVAC system does not have adequate filtering, the wildfire particulate will affect the indoor workers as per the quote cited above from the OPCCIA report. In OHCOW's field experience, in recent months we have seen MERV 4 filters in more than one HVAC system (which is surprising since during the pandemic the recommendation was for MERV 11 or 13 filters at least). MERV 4 filters can only remove <20% of the smoke particulate whereas a MERV 13 filter removes 85% of PM2.5 particulate. Thus, proper filtration in HVAC systems is needed during smoke episodes to protect indoor workers as well.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), a global society advancing human well-being through sustainable technology for the built environment, has proposed a new guideline (**ASHRAE Guideline 44P: "Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events"** https://osr.ashrae.org/Online-Comment-Database/ShowDoc2/Table/DocumentAttachments/FileName/4121-GPC44%20complete%20draft%20official%20REV%20PPR_chair_approved.pdf/download/false) to protect building occupants during wildfire or other smoke events. ASHRAE has also produced some practical guidance for building operators to create a "**Smoke Readiness Plan**" (https://www.ashrae.org/file%20library/technical%20resources/covid-19/guidance-for-commercial-building-occupants-from-smoke-during-wildfire-events.pdf). **It would be a good thing for the MLITSD to at least reference these materials, if not endorse them, in some regulatory manner.**

For outdoor workers, the **guidance provided by Health Canada** should be possible for workers to follow and expanded to include: checking hourly air quality reports, responding to symptoms with the provision of adequate respirators (e.g., fit-tested N95, but not withholding N95s from workers who aren't yet fit-tested), ensuring that workers are offered fit-testing, providing options for rescheduling work when air quality improves, providing adequate training on symptom recognition and long term health effects of smoke exposure, plus training on how and when to use respirators and their limitations. An engineering control approach could also be **providing enclosed spaces with filtering units** (portable, air-conditioners or HVACs) for outdoor workers to retreat to when experiencing symptoms for which they need reprieve. It is certainly well-known that Temporary Foreign Agricultural workers living in employer-supplied housing are highly unlikely to have any air cleaning provided, so exposure becomes 24h/day. Making the building air conditioned and cleaned would go a long way to reduce their daily smoke and other particulate exposure.

In response to concerns raised by **Temporary Foreign Agricultural Workers**, OHCOW produced a 4-page infographic (Wildfire Smoke – A Definite Concern for Workers) covering the signs and symptoms of wildfire smoke exposure as well as tips for prevention when working indoors and outdoors. It also covers employer responsibilities, provides AQHI health recommendations as well as links to additional tools and resources. This has been a very popular resource with workers, employers, JHSC members and OHS professionals for posting in a workplace or downloading and printing as a handout for workers or training sessions, and is now available in 5 languages: English, Spanish, French, Thai and Vietnamese (https://www.ohcow.on.ca/posts/wildfire-smoke-ontario-workers/).

Again, as with OHCOW's experience with heat stress, we note the **intersectionality of these environmental/workplace challenges**, i.e., heat stress, ergonomic challenges, precarious work, wildfire particulate, production stressors, complicated psychosocial conditions for vulnerable workers (such as temporary foreign workers working outdoors).

We thank the Ministry for the opportunity to contribute to this consultation and trust these comments will be helpful in your consideration of a response to worker exposures to wildfire smoke.