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THE AIR WE BREATHE

Recommendations to make indoor air
safer in the COVID era

Eleanor Hamilton

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About the author

Eleanor Hamilton is a third-year student at the School of Community and Public Affairs from Concordia University. She is looking forward to developing intersectional models of public health policy and (hopefully) addressing its apparent tension with contemporary economic thought.

THE AIR WE BREATHE

RECOMMENDATIONS TO MAKE INDOOR AIR SAFER IN THE COVID ERA

Executive summary

The importance of the air we breathe is critical to securing an equitable future for Canadians with disabilities and containing the cascading effects of a cyclical, endemic COVID.

This report outlines recent findings on the nature of COVID and how it has created a significant population of Canadians vulnerable to further infection. It provides estimates of the number of working age adults who face likely exclusion from both the labour market and disability supports that could assist them. As a result, many sectors we just called “essential” earlier in the pandemic risk hemorrhaging their workers to chronic illness, many of whom will be women given their concentration in high-risk front-facing sectors already under intense recruitment and retention pressures.

This report also reviews data that show that proper air flow, filtration, and ventilation can significantly reduce risks for the airborne transmission of COVID. This finding is especially critical in settings where other disease control factors—such as masking, physical distancing, or capacity limits—aren’t being practiced.

It proposes an 11-point plan for the federal and provincial/territorial governments to improve indoor air quality in all public spaces, to tighten regulations to ensure businesses follow suit, and to incentivize both businesses and households to retrofit their ventilation systems to make the air we breathe safer indoors. Appendix A: What Employers Can Do Immediately provides a number of interim measures for building managers who want to responsibly get ahead of the issue and assess the extent of the problem in their spaces before committing to a full ventilation retrofit.

While much of the data on COVID is preliminary at this time, the early results are worrisome. Given the health benefits of good indoor air quality, there are many compelling reasons to act on the issue. This report outlines the reasons for quick action and provides a list of things that should be done to make sure that the air we breathe indoors is the safest it can be moving forward.

Introduction

While labour market gains since the beginning of the COVID-19 pandemic have been widely reported as a “recovery,” the structural inequalities that exclude women and marginalized genders—including racialized, Indigenous, and disabled women—from equitable prosperity have been exacerbated. In the absence of an inclusive and comprehensive recovery plan, we now risk deepening those divisions. The emphasis of recovery thus far has focused on the economic impact of the pandemic. However, scientific revelations that are critical to secure the equality and human rights of disabled people, in particular disabled women, are often glossed over or omitted despite also being relevant economically.

This report identifies a key structural issue that must be acted upon by policy-makers, organized labour, and business leaders alike—to secure justice for people living with disabilities and to steer a recovery that is both inclusive and resilient to future disasters.

It’s more complex and serious than it might look at first glance: It’s the air we breathe.

In passing, federal and provincial governments have acknowledged the importance of the air we breathe through their publication of ventilation advisories, but it remains optional advice and there is no systemic compliance. This report outlines 11 things that federal and provincial/territorial governments can do to improve air quality in indoor

spaces. It also provides guidance to businesses looking to retrofit their ventilation systems to improve air safety.

COVID-19: A mass disabling event. Is Canada ready?

Research is showing that COVID infections are not reliably building immunity in the way that some public health advisors had hoped.¹ A future of seasonal and cyclical reinfection is on the horizon, and this prospect darkens when we see that the risk of post-acute complications is not decreasing with reinfection.² Each infection and reinfection poses somewhere between a one in 20 and a one in four base risk of creating chronic health problems,³ which could be increasing with each exposure. Of particular concern are the effects COVID-19 is having on the immune systems of some survivors, potentially impacting their lifelong ability to build any immunity against repeated COVID infection and other illnesses.⁴ That's an estimated 310,000 Canadians with a new vulnerability—a number that could grow as COVID's character for immune evasion emerges, and reinfection becomes the new normal.⁵

Virologists are less surprised by these findings. The tendency to compare COVID to a seasonal flu is misleading. More serious infections, such as polio, measles, or chickenpox, might be more accurate comparisons—they have conditions that can persist after the initial infection. What we would call post-polio syndrome, subacute sclerosing panencephalitis, or shingles, are all simply “long polio,” “long measles” or “long chickenpox.” Survivors of the first SARS virus also showed chronic health problems years after the epidemic ended.⁶ Long COVID presents similarly as long standing problems with Myalgic Encephalitis—we must be cautious not to exceptionalize long COVID but to understand it as an extension of post-acute viral care.

The phenomenon of long COVID poses a significant challenge to policy-makers, given the widespread transmissibility of the virus and the high probability of complications in survivors.⁷ In the absence of compulsory masking and businesses no longer observing reduced capacity requirements, the current state of play represents an unmitigated mass reinfection policy through negligence.

When public health advice says endemic waves of COVID are expected to be “less severe,” they are referring to death and hospitalizations as the only metrics of concern. Research estimates that around five per cent of all total COVID infections are severe enough after the acute phase to impact a worker's career in the long term. Drawing on

Job vacancies and long COVID

Numerous sectors have seen a sharp increase in the number of job vacancies since the beginning of the pandemic.¹³ While there has been much discussion as to the role of poor working conditions driving workers' transitions into new sectors, the link between COVID-induced chronic illness and job vacancies has received less attention in Canada.

Food and beverage servers, for instance, make up approximately 240,000 jobs in Canada and are expected to have at least a yearly exposure to COVID-19 variants.¹⁴ If even 10 per cent of those exposures result in an infection, COVID long hauler data indicate that this could result in 12,000 food and beverage servers being affected severely enough every year to either exit the labour market or require significant reductions in their working hours. This is likely an underestimate since the exposure frequency was estimated from data collected when some public safety measures around reduced capacity and outdoor-only dining were being observed.

This estimate is consistent with a finding from Brookings Metro which estimated up to 15% of American job vacancies could be related to long COVID.¹⁵ As Canada benefited from a more effective pandemic response up to this point, we would expect the proportion of vacancies attributable to long COVID to be lower overall, but not negligible especially in the highest risk sectors—particularly relevant for nursing and childcare, given the added pressures both sectors are experiencing in addition.

the United Kingdom estimates of the proportion of labour market impacts in the UK as a result of COVID, we estimate at least 200,000 Canadian COVID survivors reduced their work hours or withdrew from the labour force by summer 2022.⁸

Women, racialized people, and low-income workers bore, and continue to bear, the brunt of the disaster because they work in sectors at highest-transmission risk, shouldering the poorly understood consequences of infection, and delaying or exiting their career for unpaid care work.⁹ This remains doubly true for disabled women, who are more likely to be employed in the industries with high-infection risks without the benefit of rigorous environmental and personal hazard controls present in some care settings.¹⁰

Nor does it seem likely the sectors hit hardest by the pandemic can afford to hemorrhage talent to COVID-induced chronic illness at this speed, given the job vacancies that they report.¹¹ Federal and provincial governments likely do not envy the added pressure on their social support systems. Post-acute complications must factor in these calculations for policymakers and business leaders, because they are in calculations by workers and customers.¹²

With hundreds of thousands of people now finding themselves increasingly vulnerable to reinfection, the need to ensure adequate air quality is immediate, given that COVID is airborne. A failure to act will mean reproducing the structural inequalities that have excluded disabled people from gainful employment and public accommodations, and it will add additional pressures to disabled women already struggling to balance family responsibilities against such barriers.

There is some good news: Engineering studies have shown that proper air flow, filtration, and building ventilation can significantly reduce COVID transmission risks.¹⁶ This represents an opportunity to correct longstanding structural inequalities in both work and public accommodations.

The failure of policies, past and present

Although long COVID is the latest example, workplace health and safety, and support for unwell workers, has been inadequate for some time. Existing policies to support the survivors of complicated viral infections have long failed. Myalgic Encephalitis or Chronic Fatigue Syndrome survivors, who frequently report the aforementioned COVID and other viral infections prior to the onset of their condition, are not reliably granted disability income supports and widely report being refused accommodations at work.¹⁷ Assistive mobility devices remain a private obligation rather than a publicly offered health care provision even when they are vital to a person's recovery and daily living. Central to a recent MAiD controversy was the case of a woman with a scent-sensitivity disability who could not find housing that would accommodate her needs. Cases such as hers are only possible because air quality has not been systematically considered.¹⁸ In other words, the problems precede long COVID.

Federal and provincial governments do not appear to be making the link between infectious disease risk and indoor air quality at job sites.¹⁹ Worker's compensation and disability leave are designed to refuse claimants in ambiguous cases, often requiring occupational risk to "significantly" exceed community transmission risk. That means many who likely contracted COVID at work will be refused supports. Further, the limited occupational infection data that exists was also collected when periods of public safety measures were being observed earlier into the pandemic, meaning some industries who share all the characteristics of transmission risk will be undercounted. Without fulsome data, which no

sector other than elder care and health care consistently collect, the bias is tilted toward refusing legitimate claimants.

Lastly, even if provinces updated their occupational health and safety codes to assess air quality as part of infectious disease risk in all worksites with high interpersonal contact, most carry out only a limited number of inspections a year. With the potential for the worst-case scenario in long COVID and reinfection being significantly disruptive, no level of government should wait for a complaints-based occupational health and safety process to bring about the necessary changes. Employers and building managers will need resources to pursue the ventilation retrofits that could protect their workers and customers long before occupational health and safety inspectors come knocking on their door.

Moving beyond recovery and into resilience

Improving indoor air quality makes sense even if treatments for post-acute complications emerge and even if future variants of COVID create fewer new complications. Not only would we all benefit from reducing the impact of future COVID waves, but we'd also reduce the impact of other airborne illnesses like colds, pox viruses, and flus, or mitigate the effects of now-seasonal forest fires from climate change. Masking will continue to be wise in all crowded interiors, but workers can't count on it to be their last line of defence in settings where others are not properly masked. Further, there are improvements in cognition in spaces that circulate out stale air, which provide additional reasons to pursue air quality²⁰.

In addition, we would be securing an employment equity and accessibility requirement for survivors who are immunocompromised right now. If, or when, the conditions of these workers improve, they'll have a right to safe workplaces as they seek to re-enter the workforce under existing employment standard obligations. The International Labour Office recently reiterated a safe and healthy work environment as a fundamental principle and right at work.²¹ *The United Nations Convention on the Rights of Persons with Disabilities* (UNCRPD), of which Canada is a signatory, would compel us to view this as an accessibility issue, both in employment equity as well as enabling the access of services to vulnerable survivors.

It's also clear that the federal government's targets on improving gender equality factor in: seven of the top 10 industries at most risk for workplace airborne illness transmission are female-dominated.^{22,23}

Turning public health advice into action

While public health authorities noted some time ago the importance of air flow, there is no clear evidence that the highest-risk workplaces are systemically implementing a ventilation retrofit action plan. This is, in part, because it remains mere “advice” or an expensive nice-to-have that remains out of reach for some businesses. It is necessary for the federal government to set the bar for all employers and to provide the education and incentives to make it happen.

The approach to air quality has been haphazard so far. Unionized workplaces have seen their unions advocate for ventilation retrofits. But there are also several high-risk sectors—such as manufacturing, fitness, hospitality, retail, early childhood education, and food service with lower union density—that show little evidence of acting on this advice at all. Many restaurants, for example, changed to physical menus for QR codes, installed splatter screens, observed physical distancing, and provided hand sanitizer for customers. These are all helpful measures against illnesses spread primarily through contaminated surfaces, but they do little to protect against an illness spread primarily through the air, like COVID-19.²⁴

With the federal government unfolding an expansion of Canada’s child care sector, and the clear need for better regulation of the elder care sector, it’s important to ensure air quality standards are included in the implementation plans as it relates to the care sector. This sector already struggles with recruitment and retention; they are unlikely to alleviate this problem by hemorrhaging workers to cyclical chronic illness. Children and elders also face immune vulnerabilities and outsized adverse outcome risks.

Policy-makers at all levels of government, as well as business leaders, must now advance this advice into actionable policy.

Recommendations for the federal government

1. Update occupational health and safety inspection procedures in the federal government labour program

The *Canada Labour Code* and Canada occupational health and safety regulations are important tools in the management of federally regulated workplaces. Accordingly, the federal government should update its occupational health and safety inspection procedures to ensure that all federally regulated worksites with high degrees of interpersonal activity

are monitoring their air quality as part of a check against transmissible disease risk.

2. Create a fund to support ventilation retrofits in all public buildings, and incentives for the private sector to do the same

The federal and provincial governments should collaborate to create and administer a fund to support ventilation retrofits in all public buildings. They should also incentivize homeowners, condo/apartment owners, landlords, businesses, restaurants etc. to immediately retrofit their ventilation through a tax rebate and interest-free loan program modelled after the Canada Greener Homes Loan.

3. Set the bar for other employers

As an employer, the federal and provincial governments set the standard to which businesses operate, even if those businesses don't have a direct connection to the public service. There is an opportunity for governments to show leadership and set a higher standard for everyone. They should start by updating onboarding and training procedures for public sector staff and management to include education about the role of air quality control in workplace safety. All staff should be aware that air quality is relevant to their safety, regardless of their position, and that the government as their employer is working to protect it. All managers should be trained to assess and improve air quality where needed. They should understand that infectious disease risk is relevant to interpersonal contact and that air quality is the best defence.

4. Expand existing accessibility mechanisms to include ventilation retrofits

The Enabling Accessibility Fund's (EAF) small projects component currently specifies five impairments in its eligibility criteria—visual, hearing, mobility, mental health, and learning/developmental. While people with these impairments remain an underserved and excluded population due to structural ableism, an applicant currently has no indication that the EAF is an appropriate avenue for a ventilation retrofit, despite the accessibility implications for immunocompromised and scent-sensitive individuals.

It is important to remember, too, that the number of immunocompromised stakeholders is increasing from many long COVID cases. The *Accessible Canada Act* would encompass their needs.

The federal government should specify that air quality control is a valid application of the small projects component of the Enabling Accessibility Fund.

Air quality control must also be among the criteria used in the various mechanisms of the *Accessible Canada Act* to assess the accessibility of a space.

5. Launch a public education campaign raising awareness on the importance of air quality

While the evidence of COVID's airborne transmission has been established for some time, it remains the case that many members of the public haven't made the connection between airborne transmission and their day-to-day activities at work and leisure. What airborne transmission means is that risk increases with every quality listed here that applies in their space:

- Crowded;
- Stuffy or poor airflow;
- Activity which promotes heavy breathing;
- Occupying the same space for a long time; and
- Occupants are unmasked.

In conjunction with the explicitly listed criteria in the Enabling Accessibility Fund, this campaign could raise awareness of these funding mechanisms as an option for employers, service providers, and building managers seeking to improve their air quality standards. Individual measures, such as vaccination and masking, are much less effective when they aren't layered with environmental controls.

The federal government should launch a participatory awareness campaign in which employers, service providers, and building managers who meet elevated air quality standards can publicly display a credential showing their air is safer to breathe.

Similarly, the public should be educated to look for these credentials and understand what they mean.

6. Collaborate with the provinces to update their occupational health and safety procedures

While the federal government has an opportunity to be a leading partner in this development, the majority of workplaces, especially those at highest risk, are governed by provincial occupational health and safety laws and policies.

The federal government should encourage and incentivize the provinces to implement updates to occupational health and safety

policy. It could work to promote research and education, create tools for employers, and provide funding for retrofit programs, as it is doing via infrastructure funding programs.

7. Collect occupational infection risk data to better inform income support systems, including provincial ones, such as workers' compensation

Linked to provincial OHS procedures are the provincial income supports for workers who are injured or sick.

Of particular concern are workers' compensation and various options for disability leave. While the possibility of discovering biological markers for the post-acute complications described in this report is being investigated, these mechanisms have historically underserved survivors with chronic illnesses because common screening tests don't typically detect abnormalities.²⁵ The excessive reliance on medical testing while ignoring or downplaying patient testimony biases these systems against survivors.

The organizations that administer these mechanisms can't fairly claim that a worker is at no increased risk from workplace infection if no workplace infection data is being collected outside of certain care settings.

Health Canada should collect occupational data for everyone infected with COVID to paint a fairer picture of occupational risk.

8. Improve support systems for Canadians who are sick and/or living with disabilities

Partly due to exclusions by employers and the bias to reject legitimate disability claims, Canadians living with disabilities have reported catastrophic rates of poverty for many years.²⁶ This speaks to the problem of COVID merely adding pressure to already flawed systems, which needed to be repaired before the pandemic even began.

The federal government should proceed with planned reforms to Employment Insurance (EI) and expand income supports for underserved working age adults who don't qualify for EI or disability.

Disability assessors must take patient testimony to be compelling evidence when deciding qualification for support. Such assessments must remain the purview of a public agency whose mandate is to administer help to those who need it, rather than reject claimants to control costs.

Recommendations for provincial/territorial governments

1. Recognize transmissible disease as an occupational hazard in all jobs with interpersonal contact

Provincial occupational health and safety codes typically specify infectious disease risk only for select care settings, but many work sites with poor air quality control, crowded conditions, and unmasked occupants are transmission vectors for COVID. Moreover, most of the industries that are recognized as high risk are regulated by the provinces and territories rather than the federal government.

Accordingly, workers' compensation, disability income supports, and provincial occupational health and safety codes must recognize infectious disease risk for all work sites that have high interpersonal contact.

2. Update occupational health and safety inspection procedures to always check for air quality control

Similarly to the first point, occupational health and safety inspections should be habitually carrying out tests of the air quality in all worksites with high interpersonal contact.

3. Train provincial administrations with updated air quality safety information

As with the federal government, employees, managers, and contractors of a provincial government should be explicitly trained in the importance of air quality, its means of being tested, the plans to maintain it, and its link to disease transmission.

Conclusion

This report examines the dire need for Canadian authorities to accept that COVID-19 is an airborne virus and adjust public education and air quality standards accordingly.

Accessibility and meaningful inclusion of people living with disabilities—and especially women, racialized, Indigenous, and other marginalized communities—have been kept out of reach by ableist structural policies that were in place even before the pandemic. Women make up the bulk of the highest risk workplaces, and COVID's airborne transmission poses a serious risk to the lives of the immunocompromised survivors. It is critical that the air we breathe be fully addressed as a

safety issue—and that requires immediate leadership by all levels of government.

Recovery plans that fail to account for the critical importance of the air we breathe could unravel to repeated waves of COVID infection and reinfection, compromise the economic resilience of the country, and collapse under added pressures from climate change. It must be accounted for in forthcoming expansions in childcare, it's a key to widely reported job vacancies in many sectors, and it's necessary for Canada's human rights goals.

The recommendations in this report are what a step towards disability justice actually looks like. Failing to act here would compromise the government's commitments to "barrier-free communities, workplaces and services for all Canadians."

APPENDIX

WHAT EMPLOYERS CAN DO IMMEDIATELY

WHILE THE GOLD STANDARD for ventilation remains automated carbon dioxide monitoring keyed to a system that completes at least six full air exchanges with the exterior per hour, a full retrofit can be costly and time consuming. There are a number of interim solutions that can reduce the risk of transmission while being affordable and easier to implement.

The first is for business owners to get an estimate of their air quality with portable carbon dioxide monitors.²⁷ When we exhale, we add CO₂ to the air around us. If a room has a high amount of CO₂, it means the air that we are exhaling is not flowing out of the room. This makes CO₂ a reasonable proxy to determine the amount of airflow in an interior space. A portable CO₂ monitor is relatively inexpensive and can be easily used to check the air quality of an enclosed space. If busy rooms test 700–1,000 PPM for CO₂, that usually indicates inadequate air flow, meaning the space requires improvements in ventilation and more air exchanges.

An inexpensive and quick measure to begin improving air quality is high-efficiency particulate air (or HEPA) filter, which can clean infected aerosols from the air.²⁸ Aerosol scientists recommend air cleaners rated for HEPA without the addition of ultraviolet or other germicidal measures, as these latter components increase the cost without showing a proven benefit. Compared to a full ventilation retrofit, an adequately sized HEPA filter or an adequate number of HEPA filters placed at locations with high airflow can help to reduce the transmission risks of inadequate air flow.

Because this filters out contaminants rather than carbon dioxide, CO₂ monitors won't measure the effectiveness of this interim solution.

Aside from filtration, buildings with existing ventilation systems should ensure air exchanges are always on before, during, and after rooms are occupied or are expected to be occupied. A low level of around three air exchanges per hour can be maintained if there are few people in an enclosed space. But if masking is not being observed and/or conditions are crowded, the ventilation should be keyed to exchange the air more frequently; at least six times per hour.²⁹ Combining this with automated carbon dioxide monitoring can help reach air quality goals while reducing the power draw of ventilation. Without such automated monitoring, building managers should calibrate their air flow to meet the needs of the space's busiest times.

Cracking open windows or doors is better than nothing. However, it is not a replacement for an adequate air quality solution. The detailed specifications of adequate air flow can be found in existing government publications.³⁰ It is vital to ensure enclosed spaces meet these criteria.

Workers should also be involved in monitoring the air quality. Their onboarding should make the connection between public health and the air they breathe, plans for maintaining air quality should be outlined just like any other workplace safety measure, and they should have tools to check the quality of air in the rooms in which they work.

Lastly, for workers who have already contracted COVID and who may be struggling with long COVID, accommodations recommended by Action for Myalgic Encephalitis in the *An employer's guide to M.E.* guidebook, which is available online, are relevant for long COVID survivors who present with similar symptoms. It provides concrete examples of employers meeting their duty to accommodate employees.

The Canadian Dental Association is an excellent example of an association that got ahead of the curve, mandating air changes per hour standards to be accredited in dental offices.³¹ Other associations and workplaces should follow suit.

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