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Inside this issue

Original qualitative research

- 155** Recommendations for Canada's National Action Plan to End Gender-Based Violence: perspectives from leaders, service providers and survivors in Canada's largest city during the COVID-19 pandemic

Original quantitative research

- 171** Social isolation, loneliness and positive mental health among older adults in Canada during the COVID-19 pandemic

- 182** Access to mental health support, unmet need and preferences among adolescents during the first year of the COVID-19 pandemic

- 191** Association between annual exposure to air pollution and systolic blood pressure among adolescents in Montréal, Canada

Letter to the Editor

- 199** What we need is a political-economic public health

- 200** Re: Clinical public health: harnessing the best of both worlds in sickness and in health

- 201** Authors' response to Letters to the Editor re: Clinical public health: harnessing the best of both worlds in sickness and in health

Addendum and Publisher's Note

- 203** Recommendations for Canada's National Action Plan to End Gender-Based Violence: perspectives from leaders, service providers and survivors in Canada's largest city during the COVID-19 pandemic

Announcement

- 204** World Non-Communicable Diseases Congress 2023

- 205** Call for Papers: Social Prescribing in Canada

- 206** Other PHAC publications

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Original qualitative research

Recommendations for Canada's National Action Plan to End Gender-Based Violence: perspectives from leaders, service providers and survivors in Canada's largest city during the COVID-19 pandemic

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Abstract

Introduction: The Canadian government has committed to a national action plan (NAP) to address violence against women (VAW). However, a formalized plan for implementation has not been published. Building on existing recommendations and consultations, we conducted the first formal and peer-reviewed qualitative analysis of the perspectives of leaders, service providers and survivors on what should be considered in Canada's NAP on VAW.

Methods: We applied thematic analysis to qualitative data from 18 staff working on VAW services (11 direct support, 7 in leadership roles) and 10 VAW survivor participants of a community-based study on VAW programming during the COVID-19 pandemic in the Greater Toronto Area (Ontario, Canada).

Results: We generated 12 recommendations for Canada's NAP on VAW, which we organized into four thematic areas: (1) invest into VAW services and crisis supports (e.g. strengthen referral mechanisms to VAW programming); (2) enhance structural supports (e.g. invest in the full housing continuum for VAW survivors); (3) develop coordinated systems (e.g. strengthen collaboration between health and VAW systems); and (4) implement and evaluate primary prevention strategies (e.g. conduct a gender-based and inter-sectional analysis of existing social and public policies).

Conclusion: In this study, we developed, prioritized and nuanced recommendations for Canada's proposed NAP on VAW based on a rigorous analysis of the perspectives of VAW survivors and staff in Canada's largest city during the COVID-19 pandemic. An effective NAP will require investment in direct support organizations; equitable housing and other structural supports; strategic coordination of health, justice and social care systems; and primary prevention strategies, including gender transformative policy reform.

Highlights

- In this study, we analyzed, for the first time, the perspectives of violence-against-women leaders, service providers and survivors in the Greater Toronto Area during the COVID-19 pandemic to generate recommendations for the federal government's proposed National Action Plan to End Gender-Based Violence.
- We generated 12 recommendations for Canada's National Action Plan and organized these into four themes, including: (1) direct investment into violence-against-women services and crisis supports; (2) equitable enhancement of housing and other structural supports; (3) strategic coordination of health, justice and social care systems; and (4) implementation and evaluation of primary prevention, including gender transformative policy reform.

Keywords: domestic violence, policy, federal government, Canada, Ontario

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Introduction

Gender-based violence against women, or violence against women (VAW), is actual or threatened physical, psychological, economic or sexual violence that is disproportionately perpetrated against women or inflicted because the victim is a woman.^{1,2} The most common form of VAW is intimate partner violence (IPV).³ In Canada, 44% or 6.2 million women aged 15 years or older are estimated to have experienced IPV in their lifetime.⁴ VAW, including IPV, is one of the key determinants of injury and disease among women and, at worst, can result in death.⁵⁻⁷ The COVID-19 pandemic, including its attendant restrictions (e.g. lockdowns, quarantine and isolation, social distancing) and socioeconomic impacts (e.g. job loss, psychological distress, housing precarity), has led to increases in the incidence and severity of VAW and created and exacerbated barriers to accessing and delivering supportive services.⁸⁻¹¹

For over three decades, Canadian advocates have been calling for a national action plan (NAP) to address VAW,^{12,13} in line with Canada's international human rights obligations.¹⁴ The intended goal of NAPs is to create the necessary political, legislative, funding and research infrastructure to support sustained, coordinated action between all levels of government, civil society and other relevant stakeholders to more effectively prevent VAW. At the time of writing this manuscript, in Canada, only a "strategy to prevent and address gender-based violence" has been implemented, which solely involves federal departments.¹² At the same time, provinces and territories have their own diverse, and at times inconsistent, laws and policies around VAW (including, for instance, varying definitions of what constitutes IPV within and across jurisdictions), which need to be addressed in an effective Canadian NAP.¹⁵ In 2022, the federal government affirmed in its budget an investment of CAD 600 million over five years to advance a NAP to end gender-based violence and, with the endorsement of provincial and territorial ministers, released a high-level framework of "opportunities for action." While an important first step, this document has been critiqued for only presenting an optional set of actions for provinces and territories to consider, as opposed to commitments, without any directives for federal or national bodies.¹⁶ As a result, what

will be implemented, and how it will be implemented, as part of Canada's NAP on VAW remains an open question.

There have been several consultations with experts (e.g. VAW survivors, staff, advocates, academic researchers) over the years on what actions should be included in the proposed NAP on VAW. Most recently, the federal government's Women and Gender Equality (WAGE) ministry funded Women's Shelters Canada to develop a roadmap for developing and implementing Canada's NAP on VAW based on a list of 646 initial recommendations collected from prior reports, policy documents and other sources.¹³ The recommendations were organized into four thematic pillars, with each assigned to one working group of VAW advocates, service providers, leaders and researchers to evaluate, edit and prioritize. The final report includes 100 wide-ranging recommendations across the four pillars of (1) enabling environment and social infrastructure, (2) prevention, (3) promotion of responsive legal and justice systems, and (4) support for survivors and their families. The report also addressed the need for an intersectional feminist monitoring and evaluation framework for the NAP and the implications of statutory differences in definitions of IPV across Canadian jurisdictions. Notably, the authors recommended ongoing engagement with VAW survivors (who were not part of the working groups), sector experts and advocates in the continued development and evaluation of Canada's NAP.

We sought to build on this foundational work in the current study. We conducted the first, to our knowledge, formal and peer-reviewed qualitative analysis of the perspectives of leaders, service providers and survivors on what should be considered in the design and implementation of Canada's NAP on VAW. In doing so, we aimed to increase the transparency and rigour of our conclusions, as well as the depth of information underpinning our recommendations. Due to resource constraints, past consultations have tended to focus on participants' recommendations for the NAP, without giving space to share lived experiences with VAW, service access or sectoral work more broadly. These experiences may offer further insight into important factors to consider in VAW policy. We used data from a study of the VAW sector in Canada's largest city, Toronto, during the COVID-19 pandemic

to critically develop, nuance and prioritize recommendations for Canada's NAP on VAW. The COVID-19 pandemic has changed the landscape of VAW—exacerbating existing challenges but also creating new opportunities for transformative policy and practice—making it an important time to reconsider priorities and identify innovations.

Methods

Ethics approval

The Unity Health Toronto Research Ethics Board (REB#20-124) and the Dalhousie University Research Ethics Board (REB# 2022-6275) approved this study.

Data collection and analysis

Qualitative data were collected from April to September 2021 as part of a community-based, mixed-methods study on the processes, experiences and outcomes of adapting VAW programming during the COVID-19 pandemic in collaboration with 42 VAW organizations across the Greater Toronto Area (the MARCO-VAW Study).¹¹ The study's co-leads (ARY, an academic VAW researcher, and PS, a community-based VAW researcher) and three peer researchers (women with lived experience of gender-based violence who received training on VAW research methods¹⁷) conducted interviews, typically in pairs. Eligible participants were either (1) direct support or leadership staff working on a VAW service ("VAW staff") in the Greater Toronto Area since 11 March 2020, or (2) adult women who had accessed at least one VAW service in the Greater Toronto Area since 11 March 2020 ("VAW survivors"). We deemed any services and programs designed to support VAW survivors as relevant to the study to broaden the scope of our analysis and conclusions (Table 1). Participants provided informed consent by email prior to interviews; we used interpretation services whenever participants were not comfortable speaking in English. We provided participants with a \$40 honorarium following their interviews.

We purposively sampled staff participants from the study's larger sampling frame based on personal factors (e.g. ethnicity, race, age, years of experience), types of VAW services where participants worked, and the populations typically served. We recruited survivor participants via staff contacts in our collaborating networks,

aiming to sample a diverse cross section in terms of personal factors and types of services accessed. Our goal in purposively sampling staff and survivor participants was to capture experiences across (1) different and intersecting forms of marginalization, and (2) the diversity of VAW practice and programming. With staff support, we ensured that survivors were in a physically and mentally safe space to participate (determined through staff and interviewer safety checks).^{17,18} We provided survivor participants with a list of VAW mental health resources following their interviews. Interviews were conducted and recorded over Zoom (Zoom Video Communications, Inc., San Jose, CA, US) and transcribed verbatim using Trint (Trint Ltd., Toronto, ON, CA). At least two research assistants checked each transcript for accuracy and removed identifying information. Interviewers took field notes and were debriefed following each interview.

We used a reflexive thematic analysis methodology, which recognizes and embraces the subjectivity of researchers, encourages the use of flexible coding practices and emphasizes iterative and in-depth engagement with the data.¹⁹ Our interviews were semistructured; staff and survivor interview guides are available online.¹¹ In this analysis, we have focussed on data on gaps in policy and practice as well as data collected in response to the following questions:

Canada is currently investing CAD 600 million over five years to prevent gender-based violence under the National Action Plan to End Gender-Based Violence. This includes funds to enhance the capacity of VAW organizations, Indigenous women organizations and a crisis hotline.

- What do you think would be helpful to include in this plan?
- What immediate changes should be made in Canada to better respond to VAW?
- What long-term changes should be made to prevent VAW from happening in the first place?

Four researchers collaborated on data analysis, three of whom were also interviewers. The analysis team first coded the same two interview transcripts and met to discuss initial codes, aiming to incorporate diverse perspectives on priorities and

relevant features of the data. Each analyst was then assigned a subset of the dataset for inductive coding. Analysts met regularly to discuss the coding process. Once all data were initially coded, each analyst double coded a portion of the dataset to identify opportunities to add or refine codes and integrate perspectives. Two researchers then read through each code to develop an initial summary of the most salient data for recommendations for the NAP.

We generated recommendations based on patterns of ideas identified within the data and developed a thematic framework to summarize the relationships between these patterns. To further refine and situate our framework of recommendations, we referenced available reports on the NAP and theoretical and empirical literature on preventing VAW. Our analysis was informed by a critical feminist lens, aiming to identify the ways in which participants' experiences and thoughts demonstrate how societal structures disadvantage women at the intersection of different social identities and ways the NAP can address this.²⁰⁻²² The analysis team shared outputs regularly with the broader research team, an advisory group of VAW leaders and VAW stakeholders for feedback through meetings and knowledge translation events. We have selected quotations to support our analysis and included anonymized participant identification numbers to locate and demonstrate the scope of the data used.

Results and discussion

Table 1 summarizes the characteristics of our sample by staff (n = 18) and survivor (n = 10) participants. Most staff and survivor participants self-identified as racialized persons (most commonly Black, Latin American, or South or Southeast Asian), cisgender women and heterosexual. Almost half of participants were born outside of Canada. Most survivor participants were unemployed and had an annual income below CAD 20 000. The services that staff participants worked on and survivor participants accessed during the pandemic were wide-ranging, including mental health, shelter, child protection, health care, transitional housing, legal support, and harm reduction at generalist and community-specific organizations. Below, we summarize the four themes and corresponding recommendations that we developed through our analysis.

Invest in VAW services and increase accessibility of crisis supports

The accessibility of crisis supports for women experiencing violence was a common concern shared by both staff and survivor participants. Many survivor participants recommended investment in increasing public awareness of available VAW crisis supports (e.g. subtheme A in Table 2, [hereafter referred to as "Table 2A"], survivor C80).

Central to survivors' recommendations for increasing public awareness was the idea that women will be more likely to seek help if they realize their own experiences constitute violence. For instance, survivor C78's comments (Table 2A) demonstrate several ideas for raising public awareness, especially for women living with abusers (e.g. distributing information on the radio or in grocery stores, parks, malls, laundromats). This participant draws the connection that public information can be a first step to breaking the cycle of control of abusers, denormalizing VAW for survivors ("we are not crazy") and empowering them to seek support ("we have options"). These ideas are borne out by existing evidence: the lack of awareness of IPV, including what constitutes violence, and the lack of available resources have been found to be among the greatest barriers to survivors seeking help.²³

The importance of denormalizing VAW through public-facing campaigns was echoed by staff participants. For instance, leader P5 (Table 2A) makes the point that public information on VAW will not only support survivors reaching out to services on their own, but can also help community members, groups and agencies to understand VAW and connect survivors to available services (in addition to providing informal social support). Indeed, evaluative research suggests that information campaigns should be long-term and involve engagement with multiple stakeholders, aiming to shift public discourse and societal norms around gender and violence.²⁴ To avoid unintended harms, campaigns should use inclusive definitions of IPV (which would be aided by a statutory definition of IPV in the NAP⁹) and avoid traumatizing or stigmatizing language or imagery.^{25,26}

Information campaigns on their own, however, are not enough:²⁴ staff participants described innovations implemented

TABLE 1
Summary characteristics of the MARCO-VAW interview sample

Sociodemographic characteristic	N (%) or M (IQR)		
	Staff (n = 18)	Survivors (n = 10)	
Age (years)	47 (40–56)	43 (36–50)	
Ethno-racial identity^a			
White	7 (36%)	3 (30%)	
Black	4 (21%)	2 (20%)	
Latin American	3 (16%)	2 (20%)	
South or Southeast Asian	2 (11%)	3 (30%)	
Middle Eastern	2 (11%)	0 (0%)	
Other: Jewish	1 (5%)	0 (0%)	
Gender identity			
Ciswoman	18 (95%)	9 (90%)	
Cisman	1 (5%)	0 (0%)	
Gender diverse ^b	0 (0%)	1 (10%)	
Sexual identity			
Heterosexual or straight	15 (79%)	8 (80%)	
Gay or lesbian	1 (5%)	0 (0%)	
Bisexual	2 (11%)	1 (10%)	
Something else (e.g. queer, not sure or questioning)	1 (5%)	1 (10%)	
Country of birth			
Canada	9 (47%)	5 (50%)	
Other	10 (53%)	5 (50%)	
Total household income^c			
< CAD 20 000	—	9 (90%)	
CAD 20 000–CAD 50 000	—	1 (10%)	
Employment status^c			
Unemployed	—	6 (60%)	
Casual paid employment	—	3 (30%)	
Caregiver	—	1 (10%)	
Highest level of education^c			
High school	—	1 (10%)	
Trades or college certificate/diploma	—	7 (70%)	
University certificate/diploma	—	2 (20%)	
	Staff		
Type of VAW work or access	Leadership (n = 7)	Direct support (n = 11)	Survivors (n = 10)^d
VAW organization			
Generalist	4 (57%)	8 (73%)	10 (100%)
Community-specific ^e	3 (43%)	3 (27%)	4 (40%)
VAW service			
Residential	2 (29%)	6 (55%)	8 (80%)
Nonresidential	5 (71%)	5 (45%)	10 (100%)
VAW programming^f			
Mental health, counselling, crisis support, case management	—	3 (27%)	10 (100%)
Shelter	—	2 (18%)	8 (80%)
Transitional (second-stage) housing support	—	4 (36%)	4 (40%)
Children's aid society	—	0 (0%)	6 (60%)
Partner assault response	—	1 (9%)	0 (0%)
Other:			
Health care	—	1 (9%)	5 (50%)
Harm reduction	—	0 (0%)	1 (10%)
Legal advocacy and support	—	1 (9%)	4 (40%)

Data source: MARCO-VAW study, 2021.¹¹

Abbreviations: IQR, interquartile range; M, mean.

^a The survey measured ethno-racial identity using the Government of Ontario Data Standards for the Identification and Monitoring of Systemic Racism.

^b Includes any participant who reported the following gender identities: (a) fluid, nonbinary, gender queer or agender; (b) Indigenous or other cultural identity (e.g. two-spirit); (c) transman; or (d) transwoman. We have collapsed these categories to avoid any possible reidentification of VAW staff participants due to potentially low numbers of gender-diverse staff in the city's VAW sector.

^c Only asked of survivor participants.

^d Rows for each variable do not add up to 100%, as all survivor participants accessed multiple types of VAW services during the pandemic.

^e Community-specific organizations included language-based and culturally specific organizations.

^f Only direct support staff participants were asked to indicate their programmatic specialization, as in most cases leadership were responsible for directing, managing or supervising an entire VAW service or organization. Specializations do not add up to 100%, as one participant worked on both transitional housing support and counselling.

TABLE 2
Subthemes with example data under Theme 1: invest in VAW services and increase accessibility of crisis supports

Subtheme	Example data	
	Participant	Excerpt
A . Raising awareness of VAW and available crisis supports to increase access and denormalize VAW	Survivor C80	As I know, not a lot of people like women victims know this kind of community service. [...] I think the most important thing to do is promoting this service and advertising this service they can have.
	Survivor C78	They could make, like, more this information, more easily accessible. You know, like, because when you are living in this situation, like, you are sometimes, you are isolated. [...] So, I think that it will be good if you can hear that information, maybe you are listening to a radio station and you can listen [...] if you are going to get your groceries, maybe in there you can see a post like something like, “If you are living like this, call this number. You are not alone.” [...] We were in the mall sometimes, we are in the park with the kids. We are doing, like, laundry. [...] I mean, we need to know that we are not alone and like, we are not crazy, right? Because they [abusers] are saying, “Oh, you’re crazy. You’re just making this up.” You know, but we need to see that we have options, right?
	Leader P5	The more people that understand violence against women—whether that’s the layperson, the local church group, right, or if that’s a community agency somewhere, right—the more people that understand violence against women, the more we can get the supports to those women that are hard for me to reach.
B. Challenges in VAW referral mechanisms and the provision of wraparound supports	Direct support staff P95	[Referrals have] definitely been a challenge for us as well, because oftentimes even the information on various agencies’ websites aren’t necessarily always up to date with exactly which services are being run still or how it is that they’re being run. But I found that the way that we were able to actually reduce that barrier as much as possible was to actually—the old school way, pick up the phone and actually call those agencies and be able to have a formal discussion with either a program lead or an intake worker at another agency to see what they were still offering. And we would kind of trade off what we’re able to offer with their clients essentially as well.
	Leader P38	It would be good to have, like, kind of almost like a point person who’s, like, saying, “The shelters are open here.” [...] Because at one point, like, we couldn’t even get in touch with [the Ontario VAW crisis line].
	Leader P109	Like I was talking about the continuum of services for [our community], it’s just like some things need to be done with a translator. [...] There’s a big gap for [services specific to my community] already. But if you add to that, that most of the services were not done person-to-person no more, it had to go by virtual. [...] We did some referrals of almost a year ago at some time that we still do not have responses. [...] The referrals are already long, but it takes a lot more time.
	Survivor C73	I don’t know how much times my kids had to hear about my story and I felt pretty shitty about myself, to be honest. I wish my kids didn’t to have to hear as much they had to hear. But I had no other choice.
C. Benefits of flexible funding in providing wraparound supports	Survivor C80	So when I wanted to reach out to Canadian community, always I worried if I could deliver my message exactly or not. [...] Not everybody has [...] English perfectly. Also, for culture, I cannot understand other people’s culture. How can they understand my culture?
	Leader P137	That’s probably the biggest help because [clients] don’t have to be eating garbage [before we can help them]. And they could be, you know, “too much money for that, but not enough money for this.” We can provide clothing. We can provide money for summer activities. We can provide computers. We can provide winter coats. We can provide upgrading. So, some very concrete support we can provide.
D. Gaps in trauma-informed and specialized mental health supports	Leader P110	In terms of trauma-specific services like trauma treatment, I would love to have, to provide that service, but that requires a particular skillset that we don’t have here. [...] I can’t afford to pay for staff that would be coming with those skillsets.
	Direct support staff P103	Have real therapy offered to people at a reasonable rate—you don’t have to be rich to afford real therapy [or have] a benefit plan to afford it, because most of our clients don’t.
	Survivor C76	The stress through the beginning of the pandemic was extremely hard for me. [...] It made it worse too for my eating disorder because I just couldn’t do anything. [...] I wish that there was more access for people with mental health conditions prior to the pandemic.

Abbreviation: VAW, violence against women.

during the pandemic to broaden the accessibility of crisis supports or made recommendations to make crisis supports more accessible in the future. These included a national crisis line to coordinate contact information for provincial supports (P5), virtual (online and text) chat lines (P38) and strengthening referral pathways between crisis lines and other VAW organizations to provide immediate and ongoing support to those in high-risk situations or non-VAW shelters (P68).

Strengthening referral pathways in particular has been a major implementation challenge for VAW services, exacerbated by the pandemic; many staff participants highlighted the difficulties of connecting clients to services through VAW referral mechanisms (e.g. Table 2B, direct support staff P95). These difficulties included, for instance, getting survivors into housing or legal support—as wait times severely increased due to a lack of stock or closed courts, respectively—as well as uncertainty

over which services were open and available. Staff participants highlighted the need to increase investment into a systematic and centralized process for referrals to mitigate these challenges in future emergencies (e.g. Table 2B, leader P38).

In addition, many VAW organizations refer out to community services or programs to meet the varying needs of survivors as part of their normal practice. When those services shut down or reduced their

capacity during the pandemic, some VAW organizations did not have the capacity to offer survivors wraparound supports in-house. Leader P109 (Table 2B) provides one example of how challenges with referrals were even more difficult for community-specific services, for which the already limited pool of potential service providers became even more restricted due to the pandemic and the switch to virtual services. This loss was felt deeply by survivors. Consistent with P109's comments, survivor participants commonly described being negatively impacted by insufficient programming for children (e.g. Table 2B, survivor C73), interpretation and culturally specific services (e.g. Table 2B, survivor C80).

Ensuring that VAW organizations can provide their own wraparound supports to consistently meet survivors' varying needs, even during a pandemic, will require increased funding to expand VAW workforces, training and infrastructure. Staff participants who spoke positively about funding during the pandemic often highlighted the benefits of funders allowing flexibility for organizations to use their monies as they saw fit to respond to pandemic conditions. For instance, as leader P137 (Table 2C) illustrates, flexible funding empowered staff to better meet the needs of survivors during an otherwise disempowering time. However, VAW organizations need enough funds to benefit from flexible conditions. Across staff participants, this was more often the case for multiservice VAW organizations with larger pools of charitable and private donations to draw upon, highlighting the inadequacy of public VAW funding.

A key area that participants highlighted as requiring increased funding to VAW organizations was trauma-informed and specialized mental health supports (e.g. Table 2D, leader P110). Participants recognized that survivors' trauma has been compounded by the pandemic, with more survivors reporting more severe violence, high-risk situations (e.g. isolation with abusers, no access to finances) and COVID-19-related stress (e.g. children at home, fear of illness)—all of which have been found in other emerging research.⁸ Effectively addressing the ongoing and exacerbated mental health burden among VAW survivors requires increasing VAW funding portfolios to develop the necessary expertise in the VAW workforce to deliver mental health support (i.e. through

providing existing staff with appropriate training or hiring staff with the necessary qualifications). As both staff and survivor participants lamented, without greater and, critically, *sustained* investment, access to specialized mental health care will remain inequitable (e.g. Table 2D, direct support staff P103 and survivor C76), as is the case for access to mental health services more broadly.²⁷

Enhance structural supports for VAW

Participants' stories and recommendations highlighted the importance of developing the necessary infrastructure and funding streams within the NAP to support the full housing continuum specifically for VAW survivors—from emergency shelter to long-term supportive housing.²⁸ These limitations predated but were exacerbated by the pandemic, with the additional challenges in referral pathways and reduced availability of shelter and affordable housing.

Staff and survivor participants acknowledged the critical role that emergency VAW shelters play in supporting women fleeing violence, and the frustration of not always being able to gain access. Two participants had to access city homelessness shelters instead of, or prior to, VAW shelters. In these cases, there was a stark contrast drawn in the adequacy of the supports for VAW survivors. For instance, survivor C73 (Table 3A) described fearing for herself and her children at the city shelter, driven by the intersecting presence of men (in contrast to “a woman's place”) and alcohol use, a precursor for violence experienced by many survivors.²⁹ This was amplified by the retraumatizing experience of being exposed to potential violence in the shelter (“you would hear people yelling”) and dealing with her own history of alcohol misuse without any social or psychological support (“they didn't check on me every night to see if I'm alive”). These comments are in line with other staff and survivor participants' accounts that demonstrated the ways in which housing and homelessness policy and practice, largely guided by the experiences of men (especially white cismen), have been insufficient for VAW survivors.⁹

It was clear from participants' accounts that more investment is needed into VAW shelters as one solution—both in terms of strengthening referral pathways but also in terms of increasing funding and resourcing to support capacity, staffing

and training to collaborate with other systems in the provision of VAW care (discussed further in the following section). However, participants recognized that there must also be greater focus on longer-term housing solutions for VAW survivors.²⁸ For instance, as direct support staff P140 suggests (Table 3B), greater investment in transitional (called “second-stage” in some parts of Canada) housing for VAW survivors (typically between 1 and 5 years) as a medium-term solution in the housing continuum is an important way to establish a sense of home for survivors and their families while awaiting independent housing, the ultimate goal.³⁰ Participants juxtaposed these longer-term housing options with shelter, which, being short-term and shared, does not provide that same enduring sense of stability and independence.

While shelter has lifesaving benefits for many survivors who access it, participants also acknowledged that it is not the right option for everyone, hence the need to invest in the full VAW-housing continuum.⁹ For instance, as direct support staff P23 demonstrates (Table 3B), many women experience “hidden” homelessness (e.g. staying in violent relationships) without being able or feeling safe enough to access shelter and without adequate alternatives.³¹ This was reflected in the stories of survivor participants: for instance, survivor C74, who returned to an abusive situation after shelter; C75, who faced discrimination in the housing market as a single, pregnant woman on disability support and had to accept housing with significant water damage; and C72 and C76, who were forced to endure harassment and abuse from male neighbours without recourse or the means to move.

Participants highlighted the structural barriers that have limited safe and affordable housing for VAW survivors and driven women's risk of experiencing hidden homelessness. For instance, leader P110's comments (Table 3C) spoke to the broader issue of Canadian housing policy and residential tenancy laws not reflecting the lived realities of VAW survivors.^{9,32,33} This can result in, for instance, women fleeing their homes to leave an abuser because they are not named in the tenancy or mortgage agreement; being unable to demonstrate eligibility for supportive housing, including subsidized housing or portable housing benefits (which, for cases prioritized based on VAW, requires

TABLE 3
Subthemes with example data under Theme 2: enhance structural supports for VAW

Subtheme	Example data	
	Participant	Excerpt
A. Inadequacy of supports available to VAW survivors in homelessness compared to VAW shelters	Survivor C73	Staff never checked up on you in the emergency shelter to just see how you're doing. [...] They didn't check on me every night to see if I'm alive. I think I feel like the worst part, though, during the whole pandemic that I gone through was that emergency shelter. Yeah, because at least I could say at [the VAW shelter] I was a little bit more free. [...] It was a woman's place. So, like, I didn't have to worry about anything else, no alcohol was involved. And before I was an alcoholic, when I was 17, so like going in a woman's shelter when I actually got support over everything else, I felt more at ease. But with the emergency shelter, you see people burning out. You see people getting drunk there. Like it was a very disgusting place for kids, and it was scary—it was very, very scary. Some nights we would wake up because you hear it, felt like the walls were paper thin because you would hear people yelling. That will wake up my kids and we would be up for hours.
	Direct support staff P140	We have women in who have fled horrible situations, that are staying in homeless shelters with your kids, you know, which is then exposing themselves and kids to further trauma. So, I would say, housing, definitely [...] You have to keep it real, you're not going to get permanent housing, thousands of permanent housing built within a year. So, I would say, if we were to get more transitional housing for women and the kids who are fleeing violence, it's a start. [...] Because women leave and they go to shelters, they stay in a room with two or three kids in a room and they have to share a shower and the kitchen and the living space. If you were to get a bachelor unit, right, with independent showers and a kitchenette and a couch and a TV, couple beds—transitional housing—at least the woman and the kids will feel like they're somewhat at home until they get the adequacy of an affordable place to move into. So, I am for housing. You know, if you don't have housing, you don't have anything. [...] It provides independence, safety, you know, self-worth.
B. The need to invest in the full housing continuum for VAW survivors	Direct support staff P23	Like, I know the shelters reduced their capacity, so it's really hard to get women into shelter. And also, like, many women don't feel safe going there in the first place. So, we just need something more stable. Like, a shelter is only temporary. We need more affordable housing in the city. It's just not right. People stay in relationships and then go through this violence and hardship because of the housing issues and poverty.
	Leader P110	Violence looks differently, depending on your context, your... people. So, we decided what violence looks like at the provincial level. We decided that, yeah, in a relationship, usually there is a man and a woman and they have two kids and a dog or a cat and that both of them contribute equally to the relationship in terms of finances. They are codependent and that the both of their names are going to be in this nice lease. [...] Who did we write that policy for? Not for the clients we serve because many of them do not have their names on the leases, and many of them don't have the equitable relationship with their partners. Many of them... It's insane. It's like you're trying to fit our clients in this mould that someone in the policy office thought of based on maybe on their own contacts and their own frame of reference of what a relationship is like.
C. Gender-based inequities in social and economic resources and the determining role of Canadian law and policy	Survivor C76	So there's tons and tons and tons [of housing programming for men], but where are the mass quantities for women?
	Survivor C72	Upstairs there was this man that was so unhelpful. He kept, unfortunately, kept trying to come on to me every time I would come home and stuff. [...] Having trauma surrounding men and having PTSD and depression, I would—there was days that I just didn't want to leave the house because, between my ex knowing my codes and then the landlord of that place being a male and then that guy that lived upstairs who wasn't the landlord, but he was a tenant, but he paid well over what I paid [...] When you're living in a society that, where, you know, men have a lot of, are wielding a lot of the control and the power, it's very, very difficult for female-identified individuals to even have a success rate.
	Survivor C78	I have to do my application, my humanitarian [and compassionate application for permanent residence], right? [...] But I feel like, I mean, the difference between my friend who is getting all the help [...] is that her husband did the sponsorship [for her permanent residence], right? And the difference of my husband, he didn't, but it wasn't my fault. You know, I'm here and I'm here trying to prove myself, trying to prove that I am, you know, like I am an asset. [...] I think that the government should understand because I'm not faking this, right? [...] I got married with my husband. I have a son with him, you know, like we have a son, a child together, right? And he's having his free time, his life, right? And I'm here trying to prove myself every day. And I think it's not fair because I didn't fail, you know, I trust him.
	Leader P136	But after they're willing to seek help, if their primary needs are not taken care of, right—they don't have money, they don't have food, shelter, they don't have access to their kids—they would not leave. So that's not something that we, as an agency, can help. That's a systemic issue, right? There has to be wraparound supports for food, shelter, access to safe education without, you know, their dads picking up their kids from school, right? That's something systemic that is only empowered by policy and public dollars.

Abbreviation: VAW, violence against women.

written proof of cohabitation with an abuser during a given time period or, for newcomers, sponsorship); or lacking the finances, credit history or assets to secure their own independent housing. Thus, as P110 highlights, the social inequities between VAW survivors and their abusers are, in some cases, widened by the very policies seeking to support them.³²

This notion mapped onto participants' broader expression of injustice at the inequitable distribution of social and economic resources in society based on gender and other intersecting factors (e.g. ethnicity, race, class). This included housing supports (e.g. Table 3C, survivor C76) and discrimination in the housing market (e.g. Table 3C, survivor C72), as well as the intersecting barriers for newcomer women (e.g. Table 3C, survivor C78). However, participants' recommendations for more equitable structural supports went beyond housing, including financial (e.g. P37, increased basic need and shelter allowance), employment and education (e.g. P139, provision of training for professional certificates, resume guidance, interview coaching), legal (e.g. P138, increased funding for legal aid) and child care supports.

Leader P136's comments (Table 3C) are one example of participants' recommendations indicating the value of flexible, wraparound supports for survivors, but were clear that, in the long term, promoting gender equity and preventing VAW needs to be prioritized in all policy. Without policies that create a more equitable distribution of economic and social power in society, VAW services will not be able to prevent the reoccurrence of violence or its most extreme consequences, let alone prevent it in the first instance.

Develop coordinated systems to strengthen the response to VAW

Intersecting with the need to strengthen structural supports to respond to VAW, participants' stories illustrated the importance of better coordinating VAW services with other systems with which survivors frequently interact—especially the health and justice systems. Participants described ways in which each of these systems has not been set up to account for intersections with the specific needs of VAW survivors. For instance, survivor C76 described being in and out of hospital over the last decade and struggling to

receive the emotional, social and economic support needed for recovery—circumstances only exacerbated by the COVID-19 pandemic (Table 4A). C76 further pointed out that social assistance has been available to seniors requiring support in their day-to-day lives and accessing services. This contrasts with VAW survivors (of all ages), who are also often experiencing social isolation and physical and mental health symptoms and may benefit from similar levels of support. This service gap especially impacts survivors experiencing economic marginalization (e.g. C76, “it’s very difficult [...] when you don’t have any money or access to any kind of support”).

Although more limited in number in our sample, staff participants heavily involved in health systems work reinforced these points. For instance, leader P68, whose work is funded by the Ontario Ministry of Health, provided further context around the health care system (Table 4A), which has been operating “siloes” from the VAW sector, among others, and thus not strategically addressing the diversity of VAW survivors' needs. P115, a direct service provider in the health care system, offered additional insight (Table 4A), raising the point that the solution for better health care outcomes for VAW survivors is not necessarily the provision of VAW training to health care providers (a common suggestion³⁴), who may lack the capacity to provide intensive VAW-specific care within their regular practice.³⁵ Instead, the recommendation is to grow (and sustain) the workforce of VAW staff and advocates within the health care system—an approach that has shown promise internationally³⁶ and necessitates the strategic VAW–health care systems collaboration referred to by P68 (Table 4A).

This type of coordinated, advocate-based approach would not just support specific needs of VAW survivors navigating the health care system but would strengthen the identification and referral of at-risk patients³⁷—issues exemplified by the experiences of survivor participants who accessed the health care system prior to accessing VAW services. For instance, throughout survivor C77's pregnancy, her abusive partner, who was sponsoring her visitor's visa, accompanied her for every appointment (Table 4A), a common tactic in controlling and coercive abuse.³⁸ Despite the psychological distress she was exhibiting (e.g. “I’m having stress because I can’t

eat anything”) and the clear power imbalance in the relationship (“I don’t have a health card [...] [my partner] was going and paying [...] the fees”), her doctor never asked her partner to leave the room to safely discuss the potential of IPV, safety planning or available VAW services. Survivor C81 attended the hospital for injuries inflicted by her partner and, over the course of at least three visits, was not provided the necessary interpretation services to discuss the abuse she was experiencing (Table 4A). In both cases, neither C77 nor C81 had had prior contact with VAW services, and best practices for safe identification and referral should have been but were not implemented.³⁹

Participants were further marginalized by the system as newcomers—lacking permanent resident status (C77) or comfort speaking in English (C81). These examples demonstrate that in the implementation of any coordinated systems approach, VAW advocates must also be trained and resourced to respond to the intersections between VAW and other forms of marginalization (e.g. in these cases, social assistance for survivors without permanent resident status; interpretation services).³⁷

Challenges in the justice system for VAW survivors and staff in many ways mirrored those experienced in the health care system—including, for instance, survivors not being appropriately connected to VAW supports following contact with law enforcement (C77, C79, C81). As with the health care system, participants recommended VAW training across the justice system as a response, with certain specialized VAW staff based in the justice system recommending more of a coordinated, advocate-based approach (e.g. Table 4B, direct support staff P43). Ideally, such an approach ensures that survivors in crisis receive support from staff with specialized training in VAW and the capacity to respond appropriately.⁴⁰

However, by virtue of VAW survivors' interactions with the justice system typically involving others (e.g. partner, children), there were also more specific ways to address VAW that participants outlined. For instance, direct support staff P139 (Table 4B) raised two important challenges for VAW survivors interacting with the justice system discussed by participants: child protection and mandatory charging. Regarding child protection, staff

TABLE 4
Subthemes with example data under Theme 3: develop coordinated systems to strengthen the response to VAW

Subtheme	Example data	
	Participant	Excerpt
A. Health system not accounting for the specific needs of VAW survivors	Survivor C76	When I came into the hospital and the pandemic first happened, they had services for seniors and stuff. But for me, I was by myself and I had no help [...] I had to go in and get [a colonoscopy] and then finding someone to come pick me up was really hard [crying] because I couldn't find someone to pick me up because they needed someone to come and get me, because they put you under. And it was very shameful. [...] Those are the things that I find most challenging especially during COVID-19. It is just, like, I don't, look, I am not looking for a "handout," just a "hand up" sometimes.
	Leader P68	I think there's been some collaboration [between] VAW [and] health care. Again, you know, access to health care is limited right now. So just, I'm not aware of tables where VAW–health care discussions are happening. [...] There's a certain amount of work that's happening around homelessness and very frail seniors. And so, some of those things may intersect, but health care tends to focus on health care [laughs]. So, it's still a siloed system, I think.
	Direct support staff P115	Make us mandatory, I mean [laughs]. I think just really acknowledging that we are truly an essential service and having these clients navigate the emergency system on their own is not feasible. I'm an emergency nurse, so I see both ways. And I am telling you right now, it is not the place. Like, as an emergency nurse, I cannot support a survivor in the emergency department. It's just not possible. You don't have the time and especially with these survivors, they need time. I think that's key. Even when I do, like, an assessment on a patient, minimum, it's about an hour and a half, sometimes up to eight hours, depending on the complexity of the case. So really, if, like I said, it's just increasing forensic nurses in Ontario.
	Survivor C77	C77: My doctor knew. Actually all the time, when I visit doctor, my partner, he was going inside with me. [...] He was always going with me and my doctor, a little, she had, like, she got the sense that I'm in stress. So, she asked me some questions that, "Do you have any friends or family here?" I said, "No." And she knew that I'm on visitor visas, so I don't have health card. So, every time he was going and paying, so, the fees of the doctor. Interviewer: Did the doctor ever turn around and say to him, or your partner, or whoever was with you, "I need to speak to the patient alone," or "Unfortunately, I need to ask you to leave the room?" C77: No, she never asked that. But I think she got that sense. And she was asking me, "Do you have any stress? Do you have any stress?" I said, "Yeah, I'm having stress because I can't eat anything. I'm tired. This is..." And he was sitting there, so how I could—because at that time I was not having intention that I will leave this person or I can complain about him because I was pregnant I was not thinking to leave him, so I was just silent.
	Survivor C81	Interviewer: Did any doctor or any nurse or anybody in the hospital ask you, how did [the injuries from your partner] happen to you? Or has or did anybody ask you, is anybody hurting you? C81: No, they don't ask you because they speak English and they don't use translators and they just want to check you out and just get it done and that's it. Interviewer: Can I ask how many times the last year have you been to the hospital? C81: Three or four times.

Continued on the following page

and survivor participants spoke to P139's point about the need to include VAW survivors in the conversation and decision-making around child protection (including child apprehension)—recognizing the potential harms of family separation^{41,42} ("it's not black and white")—and provide appropriate supports to survivors throughout (and following) the process. Survivor C75's story serves as one example of this (Table 4B). Specifically, C75 was not considered in the child protection process—including examining the root of her trauma (an abusive relationship) and providing appropriate treatment—and as a result, her mental health and substance use issues worsened. This removed the opportunity to keep mother and child

together and reduced the likelihood of future family reunification, which, in many cases, has important benefits for both mother and child.⁴¹

Participants similarly articulated the importance of direct support workers (including police) being trained to identify and provide support for women's experiences of violence in responding to domestic violence calls, which legally require charging (i.e. police must lay charges when they believe there is a reasonable likelihood that domestic violence has occurred). While P139 highlights the marginalization of survivors who do not speak English and are not provided with appropriate interpretation support, direct support staff

P23 more broadly demonstrates the systematic gaps in this process (Table 4B). P23 illustrates the need for stronger coordination between the VAW and justice systems, including more trauma-informed supports for survivors involved in the justice system and stronger referral mechanisms at point-of-contact. These comments, along with P139's and C75's, speak to a larger observation around the weaponization of the justice system against VAW survivors—where survivors are criminalized (P139 and P23) or traumatized from child apprehension (C75).

In addition, participants described situations in which VAW survivors were manipulated and disempowered by abusive

TABLE 4 (continued)
Subthemes with example data under Theme 3: develop coordinated systems to strengthen the response to VAW

Subtheme	Example data	
	Participant	Excerpt
B. Justice system not accounting for the needs of VAW survivors	Direct support staff P43	Either more training for officers or a change to allow, kind of, more mental health workers, social workers to be deployed with frontline. [...] So that [...] clients know that there is more emotional support available for them right at the time that things happen.
	Direct support staff P139	Child protection [...] it's not only about the kid. I know that is important—I know that is what they are there to do. But there's so many things involved that the family, the mother, has to be included and understand. Not that I—we don't have to understand abuse or neglect, it's not about it. It's about that [...] it's not black and white. And sometimes they are very, very radical like. So, and the police as well, the police, you know the violence—so, so many times women, they don't speak the language and they're the ones that are charged that are put in jail because there is no mark, but there is a mark on the man. But they were defending themselves. So, you know, I think education. If they could provide more training for those and to have more opportunity for women.
	Survivor C75	The whole reason why I started my substance abuse is because I was going through physical abuse and I had to hide it for months, like years. I was hiding it. And then I—that's how I coped. I wanted to forget. I wanted to numb the pain. I wanted all of that. And for them to help me deal with my problem, they took my kids away. But that doesn't really help the problem. You take my kids away. And so that's going to make me drink more because now I'm depressed. You know what I mean? And so, it started out as trauma, but then they just keep building on top of that trauma and then it's kind of like, well, you just have to stop drinking. But they're building that trauma. So how do they expect you to just stop when they keep building on top of what you've already gone through?
	Direct support staff P23	With mandatory charges [...] it backfires. And, uh, yeah, it just creates this, really, the hardship for women. The system needs to change. They need to consider women's experiences going through the system to be able to support and to prevent this from happening again. [...] It's up to the police to decide. [...] They will separate people, they will mandate, like, the PAR [partner assault response] program. But at the same time, I feel like the supports are not really being provided, like it's, "Oh well, you have your charge now. You have to deal with that on top of everything that you've experienced." Like, I think police training needs to happen, really. That's how they work with people, that's problematic. I hear it from many clients, it's very, very traumatic to go through something like that. [...] If the police would say, "Okay, call here," like, you know, "they will help you,"—that would make a difference and not leave you kind of hanging and waiting. [...] After this COVID ends, we know that more programs need to be put in place. [...] We need to really work more collaboratively in this, like, you know, uh, situation and to learn from this kind of situation and improve our services because we—I feel like many people are being left behind in this COVID crisis.

Abbreviation: VAW, violence against women.

partners or professionals in high conflict cases (C74, C80, P137). Taken together, these accounts demonstrate how societal gender norms will continue to pervade the justice system if left unchecked—that is, without mandatory training and coordinated intersectoral action, including VAW- and trauma-informed advocacy—disadvantaging VAW survivors and allowing their continued exploitation by abusers, especially men who use violence.^{43,44}

Implement and evaluate primary prevention strategies for VAW

The final set of participants' recommendations for the NAP centred around policy action required to prevent VAW in the first instance. Within this domain, participants tended to focus on improving educational curricula and public awareness around healthy relationships, gender expression and what constitutes violence. There was a particular emphasis on ensuring such education begins early in life through the universal implementation in schools (e.g. Table 5A, direct support staff P92).

Inherent in P92's comments is a principle that participants widely articulated: the responsibility of preventing VAW should not fall to women alone but rather belongs to all of society—a rejection of the notion that women need to learn how to avoid "risky" situations.⁴⁵⁻⁴⁷

Staff participants highlighted the importance of directing educational and, more broadly, supportive interventions to boys and men (e.g. Table 5B, direct support staff P140). Comments like P140's make explicit the need to include boys and men in VAW prevention efforts as the most common perpetrators of VAW.⁴⁵ They also, however, highlight the current tension for VAW organizations—mandated to support women experiencing violence and chronically underfunded—in expanding their programmatic targets (e.g. only 14% of Canada's federal budget for 2022 is dedicated to women-centred measures⁴⁸). There is thus a need for increased funding dedicated to the design and delivery of educational and supportive interventions to boys and men—perhaps in some cases

by VAW organizations and in others with their collaboration—but without limiting the funding pool for women-centred supports.

Both P92's and P140's comments (Table 5A and 5B) further speak to the emphasis that participants placed on interventions that stop the cycle of violence for younger generations, including and beyond educational interventions. This is congruent with the idea that strengthening the structural response to VAW (as discussed above) will also have implications for primary prevention, by equitably improving the social and economic supports and resources available to women whose children may otherwise be at higher risk for experiencing or perpetrating violence later in life.^{46,49} In other words, policies that target the societal distribution of resources and social (including gender) norms are critical to all levels of VAW prevention (primary, secondary and tertiary).

This idea was reflected in the data, with participants discussing the importance of

TABLE 5
Subthemes with example data under Theme 4: implement and evaluate primary prevention strategies for VAW

Subtheme	Example data	
	Participant	Excerpt
A. Improving educational curricula and public awareness around VAW	Direct support staff P92	I think it's very important, education in the schools. It's not only education for the woman—because it's always, like, oh, you have to teach the woman not to, like, whatever. But I think, so, it's teaching, like, teaching students, like from Grade 3, 4, 5. [...] It's education about what is gender violence. And it is very, very important to start with the little ones and educate them about and around this and how to identify if you are having violence in your home. [...] Because kids are the future. And if they know how to prevent or how not to do it, it will be better.
B. Preventive interventions must target boys and men	Direct support staff P140	When you work with a nonprofit, funding for “this and that” is always a concern. So, we have to work with what we have and our managers always tell us to be mindful. [...] We go over and above because we're also passionate about the work we do and we wish that this whole idea of abuse would go away. But it's not, it's not going to go away any time soon. And this is why I think more and more agencies are starting to do programing with young boys and young men now. So, you know, so I mean, you can't just support the young girls and the women. You've got to, like, tap into and support the young men and boys as well. So, if we can prevent or educate them on the cycle of violence, then, you know, I think it will go a long way.
C. Redistributive and gender-transformative policies will benefit both responses to VAW and primary prevention ^a	Survivor C74	I think one of the material changes that I would advocate for heavily is a policy change around economic independence and financial independence. [...] For those who identify as women or LGBTQ individuals, that, the deal breaker is this economic component. And so how can you leave an abusive relationship when you go through all the hurdles to move the systems? [...] You do it and then there is no way to really recognize the disparity and the devastation of being economically marginalized because it's not a thing that you can point to, it's not recognized. [...] It really is going to take a deft hand and a lot of very uncomfortable conversations—which, I think the timing is right. We've seen a pandemic, we've seen the disparity. [...] But I don't see a fundamental component that I'm not sure that I can be eloquent enough to speak to, and that is that there are people who have lived experience who are not being tasked with or given the stage for which to make meaningful change. It is in the best interest to keep things status quo. [...] But we have to get to a policy. We have to stop talking about them. [...] I think it is an allocation of resources and a political will. And I see that as part of the work that I will do. [...] I'm not going to just drop it. [...] I cannot. Chances are, statistics are, and I'll just end on this note, that my daughter will experience the same thing because she's witnessed it.
	Direct support staff P37	Sometimes they're more talk than action. I guess whatever they say, they have to put the action first, too, not just talking about it.

Abbreviation: VAW, violence against women.

^a See also Table 3C.

promoting gender and intersectional equity through policy and systems change in terms of both responding to VAW and preventing it in the first instance. These multilayered benefits are well captured in survivor C74's comments (Table 5C). C74 illustrates the insidious consequences of gender-based and intersectional economic disparities in society—upheld by political systems that benefit from maintaining the “status quo”—which impact women's capacity (and that of gender- and sexually diverse people) to leave violent relationships and increase the likelihood of intergenerational cycles of VAW (“chances are [...] my daughter will experience the same thing”).^{21,47} C74 makes the point, shared by other participants (e.g. Table 4C, direct support staff P37), that preventing VAW must move beyond hypothetical discussion into transformative policy action. This will require legitimate shifts in the distribution of power, resources and prestige in society, enshrined in law and policy, that promote the “economic independence” of

all women, attending to intersecting structural barriers (e.g. racism, transphobia, ableism)—“uncomfortable” for the hegemonic classes who will inevitably lose power through redistributive policies.^{21,45} Finally, C74 echoes a point well illustrated by our study: the often neglected value of meaningfully including the perspectives of VAW survivors in policy planning.

Summary of recommendations from this study

Table 6 summarizes the recommendations for Canada's NAP on VAW based on our study findings and situates these recommendations in reference to existing literature, including the most recent NAP analyses.^{9,13,50}

Strengths and limitations

This study offers the unique contribution of developing, prioritizing and nuancing recommendations for the NAP based on a

rigorous analysis of the perspectives and experiences of survivors and staff accessing and delivering VAW services, respectively, in Toronto, Canada's largest and most diverse city, during the COVID-19 pandemic. We relied on strong partnerships with VAW sector actors and women with lived experience of violence as research team members, advisors and knowledge users. As a result, our dataset came from staff and survivors from a diversity of VAW programming across residential and nonresidential services and we maintained active engagement with our VAW stakeholders throughout analysis and dissemination using integrated knowledge translation. Our sample was high in “informational power” for our research questions, providing rich and detailed data on participants' experiences that allowed us to generate nuanced recommendations with in-depth justifications.⁵¹

We were committed to capturing the stories of staff and survivors with a diversity

TABLE 6
Summary of our priority recommendations for Canada's NAP on VAW

Recommendation	Details and reference to existing literature
Invest in VAW services and increase accessibility of crisis support	
A. Increase public awareness of VAW and crisis supports	Design and implement long-term public awareness campaigns that educate about what constitutes VAW (in all its forms) and the availability of crisis supports, and transform societal norms around gender and violence. Information campaigns should use public avenues such as radio, television, grocery stores, parks, malls, laundromats, hospitals, community centres and other public spaces and involve translation in multiple languages. Public awareness campaigns have been a key recommendation in prior NAP consultations. ^{13,50} Information campaigns should avoid traumatizing or stigmatizing language or imagery, involve multiple stakeholders (e.g. survivors, service providers, advocates, researchers) in development and implementation, and be implemented within a multipronged strategy that aims to increase the availability and accessibility of supportive services. ^{24,26}
B. Strengthen referral mechanisms to VAW programming	Develop a systematic and centralized process for referrals to VAW supports, including more accessible entry points for survivors (e.g. via virtual chat lines, with immediate availability of interpretation to multiple languages) and closer coordination between crisis lines and VAW organizations. Strengthening referral processes should include designating contact points who are responsible for keeping up to date on service availability and maintaining transparency and accountability throughout the referral process. This work necessitates more in-depth consultations with staff and survivors across the VAW and other intersecting sectors to determine priority steps for improvement (e.g. the utility of a national crisis line) and the implementation of a monitoring and evaluation system to ensure how well adaptations are working for the diversity of survivors in need. While prior NAP consultations have reviewed the importance of increased availability of VAW crisis supports, including crisis lines and integrated service delivery, ^{13,50} our study revealed important insights regarding the need for a more systematic, centralized and transparent referral system.
C. Increase the number of VAW organizations with the capacity to provide in-house wraparound supports to clients	Extending the call for the development of one-stop, multiagency hubs, ⁵⁰ our study demonstrated the need for greater investment in the VAW sector to increase VAW workforces, training and infrastructure to expand the delivery of in-house wraparound supports, even amid emergency conditions. While not all VAW organizations may realistically have the capacity to offer multiple services to clients (and would therefore benefit from stronger referral mechanisms within the VAW sector), our findings highlight the difficulties in providing holistic support to clients in the face of staff shortages and the shutdown of in-person community services during the pandemic. Our results in particular emphasize the importance of accounting for the needs of community-specific VAW organizations and services with dedicated funding to strengthen capacity for in-house programming and referral supports. This action within the NAP should be supported by directed consultations with a diversity of these organizations and survivors, with consideration of intersecting social factors (e.g. ethnicity, race, immigrant status, language, age, socioeconomic status).
D. Provide flexible funding mechanisms to VAW organizations	Funders should allow more flexibility for VAW organizations to use their monies as they see fit to respond to client demand and needs, especially in the midst of emergency conditions—a new recommendation from our study that builds on the need for increased sustainable funding to VAW services recommended in prior NAP reports ^{13,50} and reflects the evolving service context of the COVID-19 pandemic. Flexible funding would be benefitted by strengthening the monitoring and evaluation systems of VAW organizations, including improving client feedback and engagement processes, to ensure that organizations can maximize the likelihood that any adaptations meet the diverse needs of their clients.
E. Increase trauma-informed and specialized mental health supports in the VAW sector	Increase sustainable funding streams that support VAW organizations in developing and maintaining the necessary expertise (i.e. through providing existing staff with appropriate training or hiring staff with the necessary qualifications) to deliver specialized, trauma-informed mental health care to survivors, consistent with prior NAP recommendations. ¹³
Enhance structural supports for VAW	
F. Increase investment into the full housing continuum for VAW survivors	<p>Building on prior recommendations for the NAP to expand the full VAW-housing continuum,^{9,13,50} our study highlighted the need for increased investment into</p> <ul style="list-style-type: none"> • VAW shelters, including strengthening referral pathways and increasing funding and resourcing to support capacity, staffing and training to collaborate with other systems in the provision of VAW care; • second-stage (transitional) housing for VAW survivors (typically between 1 and 5 years) to provide medium-term housing solutions with psychological, legal, economic, employment and housing supports; and • safe, accessible and affordable housing for VAW survivors, with wraparound supports, including attending to survivors' safety needs in the neighbourhood and in the home, as well as greater collaboration between the VAW sector and private landlords to prevent discrimination towards VAW survivors. While the 2022 federal budget proposes that 25% of the CAD 1.5 billion earmarked for building new affordable housing units over the next two years go to women-focussed projects, it is critical that funding eligibility is inclusive of VAW organizations, and projects involving housing considerations and wraparound services for VAW survivors are supported.⁹

Continued on the following page

TABLE 6 (continued)
Summary of our priority recommendations for Canada's NAP on VAW

Recommendation	Details and reference to existing literature
G. Conduct Gender-Based Analysis Plus of housing, social and economic policies to inform policy reform that reduces gender and intersectional inequities^a	Extending prior NAP recommendations, ^{9,13,50} our study illustrated priority areas for policy reform to strengthen the structural supports for VAW survivors, including <ul style="list-style-type: none"> revising residential tenancy laws to provide greater flexibility for survivors to be added to tenancies and the removal of partners who use violence; revising eligibility criteria for housing benefits to remove requirements of cohabitation with an abuser during a given time-period or, for newcomers, sponsorship; creating opportunities for low-barrier independent housing that allows women who lack the necessary finances, credit history or assets to secure their own independent housing; increasing the basic need and shelter allowance in the provision of social assistance; increasing funding for legal aid to support VAW survivors; improving the accessibility and affordability of child care options; and improving employment and educational opportunities for women, including training for professional certificates, résumé guidance and interview coaching for VAW survivors.
Develop coordinated systems to strengthen the response to VAW	
H. Strengthen health-VAW systems coordination and collaboration	Prior NAP consultations have led to recommendations for VAW training for health care providers. ^{13,50} Based on our findings and existing evidence on intervention effectiveness, ^{35,36} this is necessary but not sufficient. We also recommend the development and sustainment of a coordinated system of VAW advocates based in the health system to support the specific needs of VAW survivors navigating the health care system and strengthen the identification and referral of at-risk patients. VAW advocates across sectors must also be trained and resourced to respond to the intersections between VAW and other forms of marginalization (e.g. social assistance for survivors without permanent resident status, interpretation services).
I. Strengthen justice-VAW systems coordination and collaboration	Paralleling the significant focus on justice system reform in Women Shelters Canada's NAP implementation guide, ¹³ based on the current analysis, we recommend VAW training across the justice system and embedding designated VAW advocates in the family and criminal justice systems to <ul style="list-style-type: none"> strengthen trauma-informed and antiracist decision-making (e.g. including around child protection and mandatory charging) that is responsive to the intersectional needs of VAW survivors (e.g. based on ethnicity, race, disability, socioeconomic status, gender or sexual identity, age, location); ensure appropriate referral mechanisms are engaged for all VAW survivors; and prevent continued patterns of abuse against survivors within the justice system (e.g. by perpetrators or professionals). In addition, across all interactions with the justice system (including law enforcement), survivors who do not speak English should be provided with appropriate interpretation support.
Implement and evaluate primary prevention strategies for VAW	
J. Improve educational curricula beginning in early years	In line with previous NAP consultations, ^{13,50} we recommend the development, implementation and evaluation of age-appropriate curricula for school-aged children to prevent VAW in collaboration with provincial education systems. Our findings highlight the importance of covering healthy relationships and gender expression and what constitutes violence.
K. Engage boys and men in VAW prevention	The Women Shelters Canada NAP implementation guide contains extensive recommendations around directing VAW preventive efforts towards boys and men. ¹³ Our analysis reinforces the importance of increased funding dedicated to the design and delivery of educational and supportive interventions to boys and men—perhaps in some cases by VAW organizations and in others with their collaboration—with the important caveat of not limiting the funding pool for women-centred supports. ⁴⁸
L. Implement redistributive and gender-transformative policies^b	Strengthening the structural response to VAW (i.e. through redistributive and gender-transformative policies) will also have implications for primary prevention, by equitably improving the social and economic supports and resources available to women whose children may otherwise be at higher risk for experiencing or perpetrating violence later in life. The perspectives of a diversity of VAW survivors and experts should be meaningfully included in policy analysis and planning.

Abbreviations: CAD, Canadian dollars; NAP, National Action Plan; VAW, violence against women.

^a See also panel L.

^b See also panel G.

of personal and social identities and especially those experiencing different forms of marginalization. For instance, 70% of the survivors we interviewed identified as racialized persons, compared to the only other pandemic study of VAW services in Canada to interview VAW survivors to date, which included only White participants.¹⁰

Nonetheless, most of our sample identified as heterosexual ciswomen and most survivor participants were economically

marginalized. We also found that community-specific organizations and racialized front-line staff tended to face more barriers to participating in this study (e.g. time in their workday); this speaks, at least in part, to the structural disadvantages that disproportionately impact them. In light of these limitations, there are nuanced experiences and perspectives within different communities that warrant further study.

In addition, our study provides an in-depth snapshot of Toronto-based perspectives.

As Canada's largest and most diverse city, with expansive health and social services, this is a critical context for informing the NAP, especially in terms of our recommendations focussed on cross-systems collaboration and wraparound supports for survivors that account for intersecting social factors. However, other municipalities and jurisdictions (including rural and remote areas with sparser or more condensed service contexts) will have unique needs that should be studied and

addressed in the NAP. One important area for future research and policy is the further development and implementation of the NAP on missing and murdered Indigenous women and girls, which should be led by Indigenous communities.

Conclusion

While the federal government has made the initial commitment to fund a NAP on VAW, and suggested a high-level framework, now is the time to enact the recommendations derived from our study and from previous NAP reports. This must include the development and implementation of a clearly defined plan as well as an ongoing feminist, intersectional and trauma-informed monitoring and evaluation system to maximize the likelihood for sustainable, effective prevention.

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Conflicts of interest

Priya Shastri and Elizabeth Tremblay are employed by the Toronto Region Violence Against Women Coordinating Committee (VAWCC). The VAWCC is funded by the Ontario Ministry of Children, Community and Social Services (MCCSS), which is a primary funder of many VAW organizations in the Greater Toronto Area. Maria Huijbregts is employed by Family Service Toronto, which receives funding from MCCSS.

Authors' contributions and statement

ARY and PS led the conceptualization and design of the study in collaboration with CM, ET, MA, PO, RM, JDM, MH, LH and AS. ARY, PS, CM, ET and MA conducted the study interviews. ARY and BS led data analysis with the support of CM and MA. ARY and BS led data interpretation in collaboration with CM, ET, MA, PO, RM, JDM, MH, LH, AS and PS. ARY wrote the first draft of the paper with support from BS. ARY, BS, CM, ET, MA, PO, RM, JDM, MH, LH, AS and PS revised the paper and approved the final version for publication.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

References

1. Council of Europe. Council of Europe convention on preventing and combating violence against women and domestic violence [Internet]. Istanbul (TR): Council of Europe; 2011 [cited 2022 Nov 30]. Available from: <https://www.coe.int/en/web/gender-matters/council-of-europe-convention-on-preventing-and-combating-violence-against-women-and-domestic-violence>
2. United Nations General Assembly. A/RES/63/155: Intensification of efforts to eliminate all forms of violence against women. New York (NY): General Assembly of the United Nations; 2009. 7 p. Available from: <https://digitallibrary.un.org/record/644013?ln=en>
3. García-Moreno C, Pallitto C, Devries K, Stockl H, Watts C, Abrahams N. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. Geneva (CH): World Health Organization; 2013. 58 p.
4. Cotter A. Intimate partner violence in Canada, 2018: an overview. Juristat. 2021:2021001.
5. Lim SS, Vos T, Flaxman AD, et al. A comparative risk assessment of burden of disease and injury attributable

to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012; 380(9859):2224-60. [https://doi.org/10.1016/S0140-6736\(12\)61766-8](https://doi.org/10.1016/S0140-6736(12)61766-8)

6. Campbell JC. Health consequences of intimate partner violence. *Lancet*. 2002;359(9314):1331-36. [https://doi.org/10.1016/S0140-6736\(02\)08336-8](https://doi.org/10.1016/S0140-6736(02)08336-8)
7. Potter LC, Morris RG, Hegarty K, García-Moreno C, Feder G. Categories and health impacts of intimate partner violence in the World Health Organization multi-country study on women's health and domestic violence. *Int J Epidemiol*. 2020;50(2):652-62. <https://doi.org/10.1093/ije/dyaa220>
8. Piquero AR, Jennings WG, Jemison E, Kaukinen C, Knaul FM. Domestic violence during the COVID-19 pandemic: evidence from a systematic review and meta-analysis. *J Crim Justice*. 2021;74:101806. <https://doi.org/10.1016/j.jcrimjus.2021.101806>
9. Yakubovich AR, Maki K. Preventing gender-based homelessness in Canada during the COVID-19 pandemic and beyond: the need to account for violence against women. *Violence Women*. 2022;28(10):2587-99. <https://doi.org/10.1177/10778012211034202>
10. Wathen CN, Burd C, MacGregor JCD, et al. "We're so limited with what we actually can do if we follow all the rules": a qualitative study of the impact of COVID-19 public health protocols on violence against women services. *BMC Pub Health*. 2022;22: 1175. <https://doi.org/10.1186/s12889-022-13550-w>
11. Yakubovich AR, Shastri P, Steele B, et al. Adapting the violence against women systems response to the COVID-19 pandemic: an overview of results from the MARCO-VAW study. Toronto (ON): MAP Centre for Urban Health Solutions, St. Michael's Hospital, Unity Health Toronto; 2022. 52 p. Available from: <https://maphealth.ca/wp-content/uploads/VAW-Report-2022.pdf>

12. Women's Shelters Canada. Renewed call for Canada to develop and implement a national action plan on violence against women [Internet]. Ottawa (ON): Women's Shelters Canada; 2019 [cited 2022 Nov 30]. Available from: <https://endvaw.ca/wp-content/uploads/2019/09/NAP-on-VAW-Election-2019.pdf>
13. Dale A, Maki K, Nitia R. A report to guide the implementation of a national action plan on violence against women and gender-based violence. Ottawa (ON): Women's Shelters Canada; 2021. 411 p. Available from: <https://nationalactionplan.ca/wp-content/uploads/2021/06/NAP-Final-Report.pdf>
14. UN Women. Handbook for national action plans on violence against women. New York (NY): UN Women; 2012. 80 p. Available from: <https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2012/7/HandbookNationalActionPlansOnVAW-en%20pdf.pdf>
15. Koshan J, Mosher J, Wiegers W. The costs of justice in domestic violence cases: mapping Canadian law and policy. In: Farrow T, Jacobs L, editors. The justice crisis: the cost and value of accessing law. Vancouver (BC): UBC Press; 2020:149-70.
16. Ending Violence Association of Canada. Joint statement on the release of the National Action Plan to End Gender-Based Violence. Ottawa (ON): EVA Canada; 2022. 7 p. Available from: <https://endvaw.wenginepowered.com/wp-content/uploads/2022/11/Final-Joint-Statement-on-NAP.pdf>
17. Ellsberg M, Heise L, Peña R, Agurto S, Winkvist A. Researching domestic violence against women: methodological and ethical considerations. Stud Fam Plann. 2001;32(1):1-16. <https://doi.org/10.1111/j.1728-4465.2001.00001.x>
18. Seff I, Vahedi L, McNelly S, Kormawa E, Stark L. Remote evaluations of violence against women and girls interventions: a rapid scoping review of tools, ethics and safety. BMJ Glob Health. 2021;6(9):e006780. <https://doi.org/10.1136/bmjgh-2021-006780>
19. Braun V, Clarke V. Reflecting on reflexive thematic analysis. Qual Res Sport Exerc Health. 2019;11(4):589-97. <https://doi.org/10.1080/2159676X.2019.1628806>
20. Heise LL. Violence against women: an integrated, ecological framework. Violence Women. 1998;4(3):262-90. <https://doi.org/10.1177/1077801298004003002>
21. Crenshaw KW. Mapping the margins: intersectionality, identity politics, and violence against women of color. Stanford Law Rev. 1991;43(6):1241-99. <https://doi.org/10.2307/1229039>
22. McPhail BA, Busch NB, Kulkarni S, Rice G. An integrative feminist model: the evolving feminist perspective on intimate partner violence. Violence Women. 2007;13(8):817-41. <https://doi.org/10.1177/1077801207302039>
23. Robinson SR, Ravi K, Voth Schrag RJ. A systematic review of barriers to formal help seeking for adult survivors of IPV in the United States, 2005-2019. Trauma Violence Abuse. 2021; 22(5):1279-95. <https://doi.org/10.1177/1524838020916254>
24. Ellsberg M, Arango DJ, Morton M, et al. Prevention of violence against women and girls: what does the evidence say? Lancet. 2015;385(9977):1555-66. [https://doi.org/10.1016/S0140-6736\(14\)61703-7](https://doi.org/10.1016/S0140-6736(14)61703-7)
25. Liang B, Goodman L, Tummala-Narra P, Weintraub S. A theoretical framework for understanding help-seeking processes among survivors of intimate partner violence. Am J Community Psychol. 2005;36(1-2):71-84. <https://doi.org/10.1007/s10464-005-6233-6>
26. West JJ. Doing more harm than good: negative health effects of intimate-partner violence campaigns. Health Mark Q. 2013;30(3):195-205. <https://doi.org/10.1080/07359683.2013.814482>
27. Durbin A, Bondy SJ, Durbin J. The association between income source and met need among community mental health service users in Ontario, Canada. Community Ment Health J. 2012;48(5):662-72. <https://doi.org/10.1007/s10597-011-9469-7>
28. Yakubovich AR, Bartsch A, Metheny N, Gesink D, O'Campo P. Housing interventions for women experiencing intimate partner violence: a systematic review. Lancet Public Health. 2021;7(1):e23-e35. [https://doi.org/10.1016/S2468-2667\(21\)00234-6](https://doi.org/10.1016/S2468-2667(21)00234-6)
29. Devries KM, Child JC, Bacchus LJ, et al. Intimate partner violence victimization and alcohol consumption in women: a systematic review and meta-analysis. Addiction. 2014;109(3):379-91. <https://doi.org/10.1111/add.12393>
30. Maki K. Breaking the cycle of abuse and closing the housing gap: second stage shelters in Canada. Ottawa (ON): Women's Shelters Canada; 2020. 95 p. Available from: <https://endvaw.ca/wp-content/uploads/2020/09/Second-Stage-Shelters-Full-Report.pdf>
31. Schwan K, Versteegh A, Perri M, et al. The state of women's housing needs and homelessness in Canada: literature review. Toronto (ON): Canadian Observatory on Homelessness Press; 2020. 280 p. Available from: https://www.homelesshub.ca/sites/default/files/attachments/state_womens_homelessness_10072020.pdf
32. Watson Hamilton J. Reforming residential tenancy law for victims of domestic violence. Annu Rev Interdiscip Justice Res. 2019;8:245-76.
33. Canadian Council on Social Development. Domestic violence in sponsor relationships among immigrant and refugee women and its links to homelessness: implications for service delivery. Ottawa (ON): Human Resources and Social Development Canada; 2006. 51 p. Available from: https://www.homelesshub.ca/sites/default/files/attachments/NRP_ENDomestic_Violence_in_Sponsor_Relationship_samong.pdf
34. Kalra N, Hooker L, Reisenhofer S, Di Tanna GL, García-Moreno C. Training healthcare providers to respond to intimate partner violence against women. Cochrane Database Syst Rev. 2021; 5(5):CD012423. <https://doi.org/10.1002/14651858.CD012423.pub2>

35. Dheensa S, Halliwell G, Daw J, Jones SK, Feder G. "From taboo to routine": a qualitative evaluation of a hospital-based advocacy intervention for domestic violence and abuse. *BMC Health Serv Res.* 2020;20:129. <https://doi.org/10.1186/s12913-020-4924-1>
36. Sohal AH, Feder G, Boomla K, et al. Improving the healthcare response to domestic violence and abuse in UK primary care: interrupted time series evaluation of a system-level training and support programme. *BMC Med.* 2020;18:48. <https://doi.org/10.1186/s12916-020-1506-3>
37. García-Moreno C, Hegarty K, d'Oliveira AFL, Koziol-McLain J, Colombini M, Feder G. The health-systems response to violence against women. *Lancet.* 2015;385(9977):1567-79. [https://doi.org/10.1016/S0140-6736\(14\)61837-7](https://doi.org/10.1016/S0140-6736(14)61837-7)
38. Hamberger LK, Larsen SE, Lehrner A. Coercive control in intimate partner violence. *Aggress Violent Behav.* 2017; 37:1-11. <https://doi.org/10.1016/j.avb.2017.08.003>
39. MacMillan HL, Kimber M, Stewart DE. Intimate partner violence: recognizing and responding safely. *JAMA.* 2020;324(12):1201-02. <https://doi.org/10.1001/jama.2020.11322>
40. Day AS, Gill AK. Applying intersectionality to partnerships between women's organizations and the criminal justice system in relation to domestic violence. *Brit J Criminol.* 2020;60(4):830-50. <https://doi.org/10.1093/bjc/azaa003>
41. Wall-Wieler E, Roos LL, Bolton J, Brownell M, Nickel NC, Chateau D. Maternal health and social outcomes after having a child taken into care: population-based longitudinal cohort study using linkable administrative data. *J Epidemiol Community Health.* 2017;71(12):1145-51. <https://doi.org/10.1136/jech-2017-209542>
42. Goodman LA, Fauci JE. The long shadow of family separation: a structural and historical introduction to mandated reporting in the domestic violence context. *J Fam Violence.* 2020; 35(3):217-23. <https://doi.org/10.1007/s10896-020-00132-w>
43. Sheehy E, Boyd SB. Penalizing women's fear: intimate partner violence and parental alienation in Canadian child custody cases. *J Soc Welf Fam Law.* 2020;42(1):80-91. <https://doi.org/10.1080/09649069.2020.1701940>
44. Letourneau N, Duffy L, Duffett-Leger L. Mothers affected by domestic violence: intersections and opportunities with the justice system. *J Fam Violence.* 2012;27(6):585-96. <https://doi.org/10.1007/s10896-012-9451-3>
45. Jewkes R, Flood M, Lang J. From work with men and boys to changes of social norms and reduction of inequities in gender relations: a conceptual shift in prevention of violence against women and girls. *Lancet.* 2015;385(9977):1580-9. [https://doi.org/10.1016/S0140-6736\(14\)61683-4](https://doi.org/10.1016/S0140-6736(14)61683-4)
46. Yakubovich AR, Stöckl H, Murray J, et al. Risk and protective factors for intimate partner violence against women: systematic review and meta-analyses of prospective-longitudinal studies. *Am J Public Health.* 2018; 108(7):e1-e11. <https://doi.org/10.2105/AJPH.2018.304428>
47. Sev'er A. A feminist analysis of flight of abused women, plight of Canadian shelters: another road to homelessness. *J Soc Distress Homeless.* 2002; 11(4):307-24. <https://doi.org/10.1023/A:1016858705481>
48. Tunney J. Government report acknowledges 'feminist' federal budget benefits men more than women. *CBC News* [Internet]; 2022 Apr 09 [cited 2022 Nov 30]. Available from: <https://www.cbc.ca/news/politics/women-budget-2022-gender-inequity-1.6414178>
49. Bourey C, Williams W, Bernstein EE, Stephenson R. Systematic review of structural interventions for intimate partner violence in low- and middle-income countries: organizing evidence for prevention. *BMC Public Health.* 2015;15:1165. <https://doi.org/10.1186/s12889-015-2460-4>
50. WomanACT. What we heard: developing Canada's National Action Plan to end gender-based violence. Toronto (ON): WomanACT; 2021. 5 p. Available from: <https://womanact.ca/publications/national-action-plan-to-end-gender-based-violence-what-we-heard/>
51. Braun V, Clarke V. To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qual Res Sport Exerc Health.* 2019; 13(2):201-16. <https://doi.org/10.1080/2159676X.2019.1704846>

Original quantitative research

Social isolation, loneliness and positive mental health among older adults in Canada during the COVID-19 pandemic

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Abstract

Introduction: Social isolation and loneliness are associated with poorer mental health among older adults. However, less is known about how these experiences are independently associated with positive mental health (PMH) during the COVID-19 pandemic.

Methods: We analyzed data from the 2020 and 2021 cycles of the Survey on COVID-19 and Mental Health to provide estimates of social isolation (i.e. living alone), loneliness and PMH outcomes (i.e. high self-rated mental health, high community belonging, mean life satisfaction) in the overall older adult population (i.e. 65+ years) and across sociodemographic groups. We also conducted logistic and linear regressions to separately and simultaneously examine how social isolation and loneliness are associated with PMH.

Results: Nearly 3 in 10 older adults reported living alone, and over a third reported feelings of loneliness due to the pandemic. When examined separately, living alone and loneliness were each associated with lower PMH. When assessed simultaneously, loneliness remained a significant independent factor associated with all three PMH outcomes (overall and across all sociodemographic groups), but living alone was only a significant factor for high community belonging in the overall population, for males and for those aged 65 to 74 years.

Conclusion: Overall, social isolation and loneliness were associated with poorer well-being among older adults in Canada during the pandemic. Loneliness remained a significant factor related to all PMH outcomes after adjusting for social isolation, but not vice versa. The findings highlight the need to appropriately identify and support lonely older adults during (and beyond) the pandemic.

Keywords: COVID-19, older adults, social isolation, living alone, loneliness, positive mental health

Introduction

The COVID-19 pandemic has had widespread negative effects on Canadians' mental health.^{1,2} Although older adults (i.e. 65+ years) appear to be doing comparatively better than younger age groups,^{1,3,4} the pandemic has still taken a toll on many older adults' mental health.⁵

For instance, in the spring of 2021, one-third (33%) of older adults reported that their mental health had worsened since the start of the pandemic.⁶ Moreover, in addition to lower mean levels of life satisfaction,¹ fewer older adults reported high self-rated mental health (SRMH) in early 2021 as compared to before the pandemic.⁴ With older adults accounting for nearly

Highlights

- This study examined the associations between social isolation (i.e. living alone) and loneliness and positive mental health among older adults in Canada during the COVID-19 pandemic.
- Nearly 3 in 10 older adults reported living alone, and more than one-third reported feelings of loneliness due to the pandemic.
- When examined separately, living alone and loneliness were each associated with poorer well-being; however, when examined simultaneously, only loneliness remained significantly associated with positive mental health, overall and across sociodemographic groups.
- Males and those aged 65 to 74 years who live alone (vs. who live with others) may also be more vulnerable to poorer mental health.

one-fifth (19%) of the Canadian population,⁷ there are urgent calls to pay attention to the unintended consequences of the pandemic on older adults' mental health.⁸

Researchers have highlighted social disruptions during the pandemic as important contributors to some older adults' poorer mental health.^{5,9} Social isolation (i.e. an objective lack of social contact and network size)⁹ and loneliness (i.e. a perceived dissatisfaction with one's social relationships)¹⁰ are associated with physical

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and mental health problems^{11,12} and poorer well-being among older adults.^{13,14} Prior to the pandemic, older adults were already at increased risk for social isolation and loneliness¹² due to life events (e.g. retirement, bereavement, health/mobility limitations),¹⁵ and community and societal factors (e.g. ageism, transportation barriers, poor access to digital technology).¹⁶ Indeed, more than a quarter of community-dwelling older adults in Canada live alone,^{14,17} a broad indicator of social isolation.¹⁸⁻²⁰ It has also been estimated that approximately 20% of older adults experience loneliness at least some of the time.²¹

Physical distancing protocols implemented during the pandemic may have further exacerbated older adults' risk for social isolation and loneliness, as they have been especially encouraged to distance from others due to the heightened probability of severe illness, hospitalization and death from COVID-19.⁴ During fall 2020, nearly a third (31%) of older adults reported wanting to participate in more social activities, most of whom (76%) cited pandemic-related restrictions as barriers to doing so.²² Many have also faced challenges with communication technology, a critical tool used for social connection during the pandemic.²¹ Consequently, many have lost access to social supports and networks previously obtained outside the household. Indeed, 11% of older adults reported that they often felt lonely in fall 2020 (up from 7% in 2019).²² Even larger proportions (26%–43%) of certain older adult populations have reported feeling lonely at least some of the time during the pandemic.^{21,23} Importantly, older adults who have experienced loneliness or social isolation (e.g. who live alone) during the pandemic appear to be at greater risk for mental health problems.⁵

However, it is important to distinguish between social isolation and loneliness, and their associated health outcomes. Due to the shared element of social disconnectedness and apparent overlap in health implications, social isolation and loneliness have previously been used as interchangeable terms,²⁴ similarly operationalized, or both.²⁵ However, whereas social isolation is the objective lack of social contacts, loneliness represents the subjective experience of feeling alone. Thus, it is possible to be socially isolated (e.g. live alone, have limited social contacts) but not feel lonely, or to feel lonely despite being socially integrated.^{26,27}

Indeed, social isolation and loneliness are only weakly to moderately correlated,^{15,19,28,29} suggesting they are related but distinct experiences.²⁹ Moreover, when the independent effects of social isolation and loneliness among older adults are considered by modelling their effects concurrently,³⁰ social isolation is uniquely or more consistently associated with physical health problems and mortality,^{15,29} while loneliness is independently or more consistently associated with mental health problems (e.g. depression).^{28,29,31} However, we know very little about their potential independent effects on positive mental health (PMH),³² an important dimension of an individual's mental and overall health. Nevertheless, in a representative sample of older German adults, loneliness (but not living alone) was significantly and negatively associated with positive affect and was a stronger predictor of lower life satisfaction than living alone.²⁸ Thus, there is a growing indication that distinguishing between, and simultaneously examining, social isolation and loneliness is important for understanding their unique health impacts.

Furthermore, subpopulations of older adults may be differentially at risk for social isolation, loneliness and their associated mental health outcomes. For example, older females in Canada are more likely to live alone than males.^{13,17,33} In the context of the pandemic, older females are also more likely to report feeling lonely,²¹ and less likely to report high SRMH than males.¹ Age may also be an important factor. For example, life satisfaction appears to increase with age among older adults,³⁴ despite concurrent increases in rates of living alone.¹³ Adults aged 75 years or older are also more likely to report always or often feeling lonely during the pandemic than those aged 65 to 74 years.³⁵ Finally, older adults with lower socioeconomic status may be more vulnerable to isolation,³³ and at greater risk for poorer mental health outcomes during the pandemic.⁵ It is, however, unknown whether the associations between social isolation, loneliness and PMH vary across sociodemographic groups. Accordingly, we sought to provide estimates for the overall older adult population, stratified by gender, age group and education level, to provide a nuanced understanding of older adults' social experiences and PMH during the pandemic.

Specifically, our first aim was to provide estimates of PMH outcomes (i.e. high SRMH, life satisfaction, high community belonging), social isolation (i.e. living alone) and feelings of loneliness among older adults during the COVID-19 pandemic (i.e. fall 2020 and winter/spring 2021). Consistent with previous findings,^{1,13,17,21,33-35} we expected some differences in the prevalence of social isolation, loneliness and PMH outcomes across sociodemographic groups. Our second aim was to separately and simultaneously examine whether social isolation and loneliness are associated with PMH outcomes. We hypothesized that, when examined separately, social isolation and loneliness would each be associated with PMH outcomes after adjusting for sociodemographic characteristics. However, when accounting for shared variance between the two constructs, consistent with previous findings,^{28,29,31} we hypothesized that loneliness (but not social isolation) would remain significantly associated with PMH outcomes. Given the novel and exploratory nature of examining these analyses across sociodemographic groups, we had no specific hypotheses regarding these associations by gender, age or education level.

Methods

Data sources and participants

We conducted a secondary analysis of cross-sectional data from the 2020³⁶ and 2021³⁷ cycles of the Survey on COVID-19 and Mental Health (SCMH), collected by Statistics Canada between 11 September and 4 December 2020, and 1 February and 7 May 2021. The target population was adults aged 18 years or older living in the 10 provinces and three territorial capitals in Canada. A random sample of dwellings was selected from within each province and territorial capital, and an adult respondent was selected from within each dwelling. Individuals living on reserves, in institutions and in noncapital cities in the territories were excluded from the survey. Respondents voluntarily completed the survey by electronic questionnaire or computer-assisted telephone interviews.

Response rates were 53.3% (n = 14 689) for the 2020 SCMH and 49.3% (n = 8032) for the 2021 SCMH. Of those, 12 344 (2020 SCMH) and 6592 (2021 SCMH) respondents agreed to share their information with the Public Health Agency of Canada

(PHAC). For our analysis, we limited the sample to adults aged 65 years and over (3493 in the 2020 SCMH; 1839 in the 2021 SCMH). To achieve sufficient sample sizes to support the analyses, data from the two cycles were pooled, for a total of 5332 respondents. Combined sociodemographic characteristics are presented in Table 1.

Measures

Positive mental health outcomes

Consistent with PHAC's Positive Mental Health Surveillance Indicator Framework,^{32,38} high SRMH, high community belonging, and life satisfaction were assessed as indicators of PMH. SRMH was assessed using the question "In general, how is your mental health?", with response options of "Excellent", "Very good", "Good", "Fair", and "Poor". Individuals who rated their mental health as "Excellent" or "Very good" were coded as having high SRMH. Community belonging was assessed by asking participants "How would you describe your sense of belonging to your local community?" Response options included "Very strong", "Somewhat strong", "Somewhat weak", and "Very weak". Individuals who responded "Very strong" or "Somewhat strong" were coded as having high community belonging. To measure life satisfaction, individuals were asked "Using a scale of 0 to 10, where 0 means 'very dissatisfied' and 10 means 'very satisfied', how do you feel about your life as a whole right now?" Responses were treated as a numerical variable.

Social isolation

Living alone status was assessed as an index of social isolation. Participants were asked "Including yourself, how many people live in your household?" Response options included "1" to "20 or more". Responses were dichotomized such that "1" was coded as living alone, and all other responses were coded as living with others.¹⁸

Loneliness

Loneliness was assessed using the question "Have you experienced any of the following impacts due to the COVID-19 pandemic?" Those who selected the response option "Feelings of loneliness or isolation" were coded as experiencing loneliness.³⁹

Covariates

Given previous indication that risk for social isolation and loneliness may differ across groups of older adults in Canada,³³

TABLE 1
Sociodemographic characteristics

Sociodemographic characteristics	% (95% CI), weighted
Gender (n = 5330)	
Males	46.6 (46.5, 46.7)
Females	53.4 (53.3, 53.6)
Age group (n = 5332)	
65–74 years	63.2 (61.3, 65.1)
75+ years	36.8 (34.9, 38.7)
Highest education level (n = 5314)	
High school and below	44.2 (42.2, 46.2)
Postsecondary education	55.8 (53.8, 57.8)
Place of residence (n = 5303)	
Population centre	78.3 (76.8, 79.9)
Rural area	21.7 (20.1, 23.2)
Racialized group member^a (n = 5267)	
Yes	9.8 (8.4, 11.2)
No	90.2 (88.8, 91.6)
Immigrant status (n = 5294)	
Yes	22.8 (21.0, 24.7)
No	77.2 (75.4, 79.0)

Data source: 2020 and 2021 Survey on COVID-19 and Mental Health, combined.

Abbreviation: CI, confidence interval.

Notes: Missing data were excluded from percentages. Gender-diverse individuals were excluded from gender percentages due to the small sample size (< 0.01%).

^a Individuals classified as a visible minority or who identified as Indigenous.

the following sociodemographic variables were statistically controlled for in the regression analyses: gender (male, female), age group (65–74 years, 75+ years), the individual's highest level of education (high school and below, postsecondary), place of residence (population centre, rural), racialized group member status (yes, no), and immigrant status (yes, no). Highest education level was selected as a proxy for socioeconomic status over income level, as many older adults are likely to have transitioned from employment to retirement.¹⁵ Individuals classified as a visible minority or who identified as Indigenous were coded as racialized group members (vs. White). Landed immigrants and nonpermanent residents were coded as immigrants (vs. Canadian-born).¹

Analyses

Analyses were conducted in SAS Enterprise Guide version 7.1 (SAS Institute Inc., Cary, NC, US). All analyses were conducted using survey and bootstrap weights provided by Statistics Canada to account for the complex survey design, to

adjust for nonresponses and to make the results representative of community-dwelling older adults living in the 10 provinces and three territorial capitals.

Descriptive statistics were used to calculate percentages, means and 95% confidence intervals (CIs) for all main study variables. Differences between sociodemographic groups were determined based on two-tailed hypothesis tests at a significance level of $p < 0.05$. Next, mean life satisfaction and the percentage of individuals reporting high SRMH and high community belonging by living alone and loneliness indicators were assessed.

Logistic regression analyses were conducted to explore the associations of living alone and loneliness with high SRMH and high community belonging. Linear regression analyses were conducted to explore the associations of living alone and loneliness with life satisfaction. Living alone (Model 1) and loneliness (Model 2) were first entered separately as explanatory variables, while controlling for sociodemographic covariates. Next,

living alone and loneliness were included simultaneously as explanatory variables (Model 3) to account for any shared variance, again controlling for sociodemographic covariates. Odds ratios with 95% CIs that did not include 1.00 and regression coefficients with 95% CIs that did not include 0 were interpreted as statistically significant.

Analyses were conducted for the overall sample, and stratified by gender (male, female), age group (65–74 years, 75+ years) and highest education level (high school and below, postsecondary). To maximize sample sizes, regression models for each PMH outcome included all individuals with complete data for the relevant questions. Gender-diverse respondents were excluded from all regression analyses due to insufficient samples. Sample sizes within sets of regression analyses for PMH outcomes were kept consistent to make Models 1 and 2 comparable with Model 3.

Results

Descriptive statistics

Descriptive statistics are presented in Table 2. Overall, 70.2% of older adults

reported high SRMH, with females (vs. males), those aged 65 to 74 years (vs. 75+ years), and those with high school education or below (vs. postsecondary) less likely to report high SRMH. Nearly three-quarters (74.6%) of older adults reported high community belonging. Females (vs. males), those aged 65 to 74 years (vs. 75+ years) and those with postsecondary education (vs. high school or below) were less likely to report high community belonging. On a scale of 0 (very dissatisfied) to 10 (very satisfied), older adults reported an average life satisfaction score of 7.6, with females (vs. males) and those with postsecondary education (vs. high school or below) reporting lower mean scores. Overall, 29.0% of older adults reported living alone. Females (vs. males), those aged 75 years and older (vs. 65–74 years) and those with high school education or below (vs. postsecondary education) were more likely to be living alone. Finally, over one-third (34.1%) of older adults reported feeling lonely due to the pandemic, with a greater proportion of females reporting feelings of loneliness than males.

Living alone and PMH

Model 1 analyses revealed that, after taking sociodemographic covariates into account,

older adults living alone were overall significantly less likely to report high SRMH and community belonging, and reported lower average life satisfaction than those living with others (Table 3). These associations remained for males (Table 4), those aged 65 to 74 years (Table 5), and those with postsecondary education (Table 6). Additionally, those aged 75 years and older living alone were significantly less likely to report high SRMH (but not high community belonging or lower life satisfaction) as compared to those living with others (Table 5). Those with high school education or below living alone reported lower life satisfaction than those living with others (but did not differ on high SRMH or high community belonging; Table 6).

After adjusting for loneliness (Model 3), those living alone (vs. with others) were significantly less likely to report high community belonging in the overall population (Table 3), among males (Table 4) and among those aged 65 to 74 years (Table 5), with associations of similar magnitude as in the unadjusted analyses. However, living alone was no longer significantly associated with high SRMH or life satisfaction

TABLE 2
Descriptive statistics of living alone, loneliness and positive mental health outcomes among older adults in Canada during the COVID-19 pandemic, overall and stratified by gender, age group and education level

Variable	Overall n = 5332	Gender		Age group		Highest education level	
		Males n = 2306	Females n = 3024	65–74 years n = 3388	75+ years n = 1944	High school and below n = 2204	Postsecondary education n = 3110
				% (95% CI)			
Living alone	29.0 (27.6, 30.4)	19.2 (17.3, 21.2)	37.6 (35.3, 39.9)	24.7 (22.9, 26.5)	36.5 (33.7, 39.3)	32.4 (30.0, 34.8)	26.5 (24.6, 28.4)
		p < 0.001		p < 0.001		p < 0.001	
Loneliness	34.1 (32.3, 35.9)	24.5 (22.1, 27.0)	42.4 (39.7, 45.0)	33.3 (31.1, 35.5)	35.6 (32.3, 38.5)	33.6 (30.8, 36.3)	34.5 (31.9, 37.0)
		p < 0.001		<i>p = 0.29</i>		<i>p = 0.65</i>	
High self-rated mental health	70.2 (68.3, 72.1)	74.5 (71.9, 77.1)	66.5 (63.9, 69.1)	68.6 (66.1, 71.1)	73.0 (70.3, 75.7)	66.6 (63.7, 69.5)	73.1 (70.6, 75.7)
		p < 0.001		p = 0.02		p = 0.001	
High community belonging	74.6 (72.8, 76.4)	76.8 (74.2, 79.4)	72.7 (70.3, 75.1)	72.6 (70.3, 74.9)	78.0 (75.2, 80.8)	77.8 (75.3, 80.3)	71.9 (69.4, 74.4)
		p = 0.02		p = 0.003		p = 0.001	
		Mean (95% CI)					
Life satisfaction	7.6 (7.5, 7.7)	7.7 (7.6, 7.9)	7.5 (7.4, 7.6)	7.6 (7.5, 7.7)	7.7 (7.6, 7.9)	7.7 (7.6, 7.9)	7.5 (7.4, 7.6)
		p = 0.02		p = 0.07		p = 0.01	

Data source: 2020 and 2021 Survey on COVID-19 and Mental Health, combined.

Abbreviation: CI, confidence interval.

Notes: Life satisfaction was rated on a scale from 0 (very dissatisfied) to 10 (very satisfied). Statistically significant differences between sociodemographic groups (at $p < 0.05$) are bolded.

TABLE 3
Associations between living alone and loneliness and indicators of positive mental health among older adults during the COVID-19 pandemic

	High self-rated mental health			High community belonging			Life satisfaction					
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3			
	% (95% CI)	aOR (95% CI)	aOR (95% CI)	% (95% CI)	aOR (95% CI)	aOR (95% CI)	Mean (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)		
Overall	n = 5068			n = 5047			n = 5057					
Living alone												
Yes	65.11 (62.3, 67.9)	0.74 (0.61, 0.89)	—	0.85 (0.70, 1.04)	70.2 (67.5, 72.8)	0.72 (0.59, 0.87)	—	0.81 (0.67, 0.99)	7.4 (7.3, 7.5)	-0.28 (-0.45, -0.11)	—	-0.08 (-0.23, 0.08)
No	76.3 (69.9, 74.8)	(ref.)	—	(ref.)	76.4 (74.2, 78.6)	(ref.)	—	(ref.)	7.7 (7.6, 7.8)	(ref.)	—	(ref.)
Loneliness												
Yes	52.1 (48.6, 55.5)	—	0.28 (0.23, 0.35)	0.29 (0.23, 0.35)	60.8 (57.5, 64.2)	—	0.35 (0.29, 0.43)	0.36 (0.29, 0.44)	6.6 (6.4, 6.7)	—	-1.60 (-1.79, -1.42)	-1.60 (-1.79, -1.40)
No	79.2 (77.0, 81.5)	—	(ref.)	(ref.)	81.2 (79.2, 83.3)	—	(ref.)	(ref.)	8.2 (8.1, 8.3)	—	(ref.)	(ref.)

Data source: 2020 and 2021 Survey on COVID-19 and Mental Health, combined.

Abbreviations: aOR, adjusted odds ratio; B, adjusted unstandardized regression coefficient; CI, confidence interval; ref., reference group.

Notes: Explanatory variables are living alone (Model 1), loneliness (Model 2) and both (Model 3). All models are adjusted for age, gender, highest education, place of residence, immigrant status and racialized group member status. Gender-diverse and missing data are excluded from all regression analyses. Statistically significant odds ratios and regression coefficients are bolded.

in the overall sample (Table 3) or across sociodemographic groups (Tables 4–6).

Loneliness and PMH

Model 2 results indicated that, after taking sociodemographic covariates into account, older adults experiencing loneliness were significantly less likely to report high SRMH and high community belonging, and reported significantly lower life satisfaction than those who were not lonely, overall and across all sociodemographic groups (Tables 3–6). These associations remained significant (and of similar magnitude) after adjusting for living alone status (Model 3).

Discussion

The goal of our study was to examine older adults' social experiences and PMH during the pandemic. Although the majority of older adults reported PMH during the pandemic, some sociodemographic groups were less likely to report high SRMH (i.e. females, those aged 65–74 years and those with a high school education or below) and high community belonging

(i.e. females, those aged 65–74 years and those with a postsecondary education), and had lower mean life satisfaction (i.e. females and those with a postsecondary education).

Social isolation (assessed via living alone status) and loneliness were not uncommon among older adults during the pandemic. Consistent with pre-pandemic rates,¹⁷ almost 3 in 10 older adults reported living alone, with higher rates among females, those aged 75 years and older and those with high school education or below.¹³ Over a third of older adults reported feelings of loneliness due to the pandemic and, consistent with pre-pandemic findings,¹⁵ females were more likely to report loneliness than males. When examined separately, living alone and loneliness were each associated with lower mean life satisfaction and a lower likelihood of reporting high SRMH and high community belonging in the overall population. When living alone and loneliness were assessed simultaneously, loneliness remained significantly associated with all PMH indicators, whereas living alone was only significantly associated with high community

belonging overall and among males and adults aged 65 to 74 years.

Overall, our findings support calls to enhance social connections to support well-being as a public health priority.^{9,16} However, consistent with previous studies,^{28,29,31} our findings suggest that the subjective feeling of loneliness is a more consistent correlate of PMH outcomes than the objective social isolation measure of living alone among community-dwelling older adults. By contrast, associations between social isolation and PMH may be largely attributable to shared variance with loneliness³¹ and/or restricted to certain sociodemographic groups. For instance, older males living alone may be less likely to report high community belonging because they tend to have smaller social networks and less stable family contact, and are at increased risk of isolation due to divorce or widowhood.⁴⁰ Adults aged 65 to 74 years who live alone may also be less likely to report high community belonging because living alone is less common for this group as compared to older age groups (and therefore more alienating), they have more recently lost

TABLE 4
Associations between living alone and loneliness and indicators of positive mental health among older adults during the COVID-19 pandemic, stratified by gender

	High self-rated mental health				High community belonging				Life satisfaction			
	Model 1	Model 2	Model 3		Model 1	Model 2	Model 3	Mean	Model 1	Model 2	Model 3	
	% (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	% (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	Mean (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Males	n = 2190				n = 2183				n = 2184			
Living alone												
Yes	66.9 (62.0, 71.9)	0.63 (0.47 , 0.85)	—	0.73 (0.53, 1.01)	70.9 (66.0, 75.8)	0.61 (0.45 , 0.82)	—	0.70 (0.51 , 0.96)	7.4 (7.2, 7.6)	-0.43 (-0.71 , -0.15)	—	-0.23 (-0.50, 0.04)
No	76.2 (73.2, 79.3)	(ref.)	—	(ref.)	78.3 (75.3, 81.3)	(ref.)	—	(ref.)	7.8 (7.7, 8.0)	(ref.)	—	(ref.)
Loneliness												
Yes	55.6 (49.7, 61.4)	—	0.28 (0.20 , 0.38)	0.28 (0.21 , 0.39)	60.2 (54.5, 66.0)	—	0.30 (0.22 , 0.41)	0.31 (0.23 , 0.43)	6.6 (6.3, 6.9)	—	-1.54 (-1.85 , -1.22)	-1.51 (-1.83 , -1.18)
No	80.5 (77.5, 83.4)	—	(ref.)	(ref.)	81.7 (78.9, 84.6)	—	(ref.)	(ref.)	8.1 (8.0, 8.2)	—	(ref.)	(ref.)
Females	n = 2878				n = 2864				n = 2873			
Living alone												
Yes	64.3 (60.9, 67.7)	0.80 (0.63, 1.02)	—	0.93 (0.72, 1.21)	69.9 (66.9, 73.0)	0.79 (0.62, 1.00)	—	0.89 (0.69, 1.14)	7.4 (7.3, 7.6)	-0.22 (-0.44 , 0.01)	—	0.01 (-0.19, 0.20)
No	68.0 (64.3, 71.7)	(ref.)	—	(ref.)	74.3 (71.0, 77.5)	(ref.)	—	(ref.)	7.6 (7.5, 7.8)	(ref.)	—	(ref.)
Loneliness												
Yes	50.3 (46.0, 54.6)	—	0.29 (0.22 , 0.38)	0.29 (0.22 , 0.38)	61.1 (57.2, 65.1)	—	0.38 (0.29 , 0.50)	0.39 (0.30 , 0.51)	6.5 (6.4, 6.7)	—	-1.65 (-1.87 , -1.43)	-1.65 (-1.88 , -1.43)
No	77.8 (74.6, 81.0)	—	(ref.)	(ref.)	80.7 (77.8, 83.5)	—	(ref.)	(ref.)	8.2 (8.1, 8.4)	—	(ref.)	(ref.)

Data source: 2020 and 2021 Survey on COVID-19 and Mental Health, combined.

Abbreviations: aOR, adjusted odds ratio; B, adjusted unstandardized regression coefficient; CI, confidence interval; ref., reference group.

Notes: Explanatory variables are living alone (Model 1), loneliness (Model 2) and both (Model 3). All models are adjusted for age, highest education, place of residence, immigrant status and racialized group member status. Gender-diverse and missing data are excluded from all regression analyses. Statistically significant odds ratios and regression coefficients are bolded.

sources of social connection due to retirement or other life transitions,¹⁵ and/or they have less experience living alone than their older counterparts.

This study informs public health policy and opportunities to enhance older adult health care through the use of targeted identification and support strategies. For example, primary care workers (e.g. family physicians, social workers) are uniquely positioned to screen for social vulnerabilities and initiate services.⁴¹ Training practitioners to assess social vulnerabilities as part of regular care practices may be

critical for identifying those at risk for poorer well-being.

Additionally, funding is needed for programs and services that specifically target loneliness among older adults. For example, at the individual level, programs that teach older adults how to develop and maintain meaningful and emotionally satisfying relationships (e.g. social skills training) and that facilitate connection (e.g. through shared-interest activities) may be more beneficial than solely increasing the quantity of social interactions.^{16,42} Offering cognitive modification programs, which involve reframing

maladaptive perceptions about social relationships, as an accessible mental health service for older adults may also help reduce feelings of loneliness,^{16,43} particularly in the context of a pandemic, when in-person social interactions are limited.⁴⁴

However, community- and societal-level investments to support older adults are also warranted, including improving infrastructure and creating age-friendly communities (e.g. accessible transportation and services, digital inclusion, safe outdoor spaces, affordable and well-designed housing) and developing policies to address systemic barriers to older adults'

TABLE 5
Associations between living alone and loneliness and indicators of positive mental health among older adults during the COVID-19 pandemic, stratified by age group

	High self-rated mental health				High community belonging				Life satisfaction			
	Model 1	Model 2	Model 3	%	Model 1	Model 2	Model 3	Mean	Model 1	Model 2	Model 3	
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)		aOR (95% CI)	aOR (95% CI)	aOR (95% CI)		B (95% CI)	B (95% CI)	B (95% CI)	
65–74 years	n = 3225				n = 3216				n = 3219			
Living alone												
Yes	62.7 (58.8, 66.6)	0.74 (0.59, 0.93)	—	0.93 (0.73, 1.18)	65.9 (62.2, 69.7)	0.67 (0.53, 0.84)	—	0.76 (0.60, 0.97)	7.3 (7.1, 7.5)	-0.30 (-0.52, -0.08)	—	-0.03 (-0.23, 0.17)
No	70.6 (67.5, 73.6)	(ref.)	—	(ref.)	74.9 (72.1, 77.6)	(ref.)	—	(ref.)	7.7 (7.5, 7.8)	(ref.)	—	(ref.)
Loneliness												
Yes	46.8 (42.3, 51.3)	—	0.23 (0.17, 0.30)	0.23 (0.18, 0.30)	59.7 (55.5, 63.9)	—	0.40 (0.31, 0.52)	0.41 (0.32, 0.54)	6.5 (6.3, 6.6)	—	-1.64 (-1.86, -1.42)	-1.63 (-1.86, -1.41)
No	79.4 (76.5, 82.4)	—	(ref.)	(ref.)	78.8 (76.1, 81.5)	—	(ref.)	(ref.)	8.1 (8.0, 8.2)	—	(ref.)	(ref.)
75+ years	n = 1843				n = 1831				n = 1838			
Living alone												
Yes	67.9 (63.9, 71.9)	0.72 (0.53, 0.99)	—	0.78 (0.56, 1.08)	75.1 (71.4, 78.9)	0.81 (0.57, 1.15)	—	0.90 (0.63, 1.30)	7.5 (7.4, 7.7)	-0.26 (-0.54, 0.01)	—	-0.13 (-0.39, 0.12)
No	76.0 (72.2, 79.8)	(ref.)	—	(ref.)	79.5 (75.7, 83.4)	(ref.)	—	(ref.)	7.8 (7.6, 8.0)	(ref.)	—	(ref.)
Loneliness												
Yes	60.6 (55.4, 65.9)	—	0.40 (0.29, 0.56)	0.41 (0.30, 0.57)	62.7 (57.2, 68.2)	—	0.27 (0.19, 0.38)	0.27 (0.19, 0.38)	6.7 (6.5, 7.0)	—	-1.56 (-1.85, -1.26)	-1.55 (-1.84, -1.25)
No	78.9 (75.5, 82.3)	—	(ref.)	(ref.)	85.5 (82.6, 88.5)	—	(ref.)	(ref.)	8.3 (8.1, 8.4)	—	(ref.)	(ref.)

Data source: 2020 and 2021 Survey on COVID-19 and Mental Health, combined.

Abbreviations: aOR, adjusted odds ratio; B, adjusted unstandardized regression coefficient; CI, confidence interval; ref., reference group.

Notes: Explanatory variables are living alone (Model 1), loneliness (Model 2) and both (Model 3). All models are adjusted for gender, highest education, place of residence, immigrant status and racialized group member status. Gender-diverse and missing data are excluded from all regression analyses. Statistically significant odds ratios and regression coefficients are bolded.

social inclusion (e.g. combatting ageism, socioeconomic inequality).^{16,21} Our findings suggest that certain populations (e.g. females, those aged 75+ years) are disproportionately at risk for isolation or loneliness, or both, and therefore may especially benefit from such efforts. However, future work examining whether such programs, supports and policies positively impact PMH is also needed.

Strengths and limitations

Our study addresses important evidence gaps by examining the wider health

impacts of the COVID-19 pandemic on PMH using a population-based sample of older adults. We provided estimates of multiple indicators of PMH, as well as social isolation and loneliness during the pandemic. Furthermore, we examined the associations of social isolation and loneliness with PMH overall, and stratified by gender, age group and education level.

Despite these contributions, the findings should be interpreted within the context of important limitations. To begin with, data from the SCM were cross-sectional and therefore neither causality nor temporality

could be established, and it is possible that there are bidirectional effects (e.g. those with poorer mental health may be more likely to feel lonely or be isolated).¹¹ Additionally, there may be more complex effects among the constructs of interest that cannot be established with the current data. For example, loneliness may mediate the association between social isolation and PMH. In other words, individuals who live alone may have poorer mental health because they feel lonelier.

The data also did not capture social isolation or loneliness experiences before the

TABLE 6
Associations between living alone and loneliness and indicators of positive mental health among older adults during the COVID-19 pandemic, stratified by education level

	High self-rated mental health				High community belonging				Life satisfaction			
	Model 1		Model 2	Model 3	Model 1		Model 2	Model 3	Model 1	Model 2	Model 3	
	% (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	% (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	Mean (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
High school and below	n = 2101				n = 2092				n = 2096			
Living alone												
Yes	63.3 (59.1, 67.5)	0.81 (0.62, 1.06)	—	0.90 (0.68, 1.19)	74.3 (70.4, 78.2)	0.77 (0.58, 1.03)	—	0.83 (0.62, 1.12)	7.5 (7.4, 7.7)	-0.28 (-0.54, -0.03)	—	-0.12 (-0.35, 0.11)
No	68.2 (64.4, 72.0)	(ref.)	—	(ref.)	79.4 (76.3, 82.6)	(ref.)	—	(ref.)	7.8 (7.7, 8.0)	(ref.)	—	(ref.)
Loneliness												
Yes	46.5 (41.1, 52.0)	—	0.27 (0.20, 0.36)	0.27 (0.20, 0.36)	65.7 (60.8, 70.7)	—	0.40 (0.29, 0.55)	0.41 (0.30, 0.56)	6.5 (6.3, 6.8)	—	-1.85 (-2.12, -1.57)	-1.83 (-2.11, -1.56)
No	76.1 (72.9, 79.4)	—	(ref.)	(ref.)	83.6 (80.9, 86.3)	—	(ref.)	(ref.)	8.3 (8.2, 8.5)	—	(ref.)	(ref.)
Postsecondary education	n = 2967				n = 2955				n = 2961			
Living alone												
Yes	66.7 (62.9, 70.5)	0.68 (0.52, 0.88)	—	0.81 (0.61, 1.07)	66.3 (62.4, 70.1)	0.68 (0.52, 0.88)	—	0.79 (0.61, 1.04)	7.3 (7.1, 7.4)	-0.28 (-0.50, -0.06)	—	-0.05 (-0.27, 0.16)
No	75.5 (72.3, 78.6)	(ref.)	—	(ref.)	74.0 (70.9, 77.1)	(ref.)	—	(ref.)	7.6 (7.5, 7.8)	(ref.)	—	(ref.)
Loneliness												
Yes	56.3 (51.8, 60.7)	—	0.30 (0.23, 0.40)	0.31 (0.23, 0.41)	56.7 (52.3, 61.2)	—	0.32 (0.25, 0.42)	0.33 (0.25, 0.43)	6.6 (6.4, 6.8)	—	-1.41 (-1.67, -1.16)	-1.40 (-1.67, -1.14)
No	81.8 (78.7, 84.9)	—	(ref.)	(ref.)	79.3 (76.4, 82.2)	—	(ref.)	(ref.)	8.0 (7.9, 8.2)	—	(ref.)	(ref.)

Data source: 2020 and 2021 Survey on COVID-19 and Mental Health, combined.

Abbreviations: aOR, adjusted odds ratio; B, adjusted unstandardized regression coefficient; CI, confidence interval; ref., reference group.

Notes: Explanatory variables are living alone (Model 1), loneliness (Model 2) and both (Model 3). All models are adjusted for age, gender, place of residence, immigrant status and racialized group member status. Gender-diverse and missing data are excluded from all regression analyses. Statistically significant odds ratios and regression coefficients are bolded.

pandemic, loneliness due to causes other than the pandemic, or changes in severity that may have occurred throughout the pandemic. Although older adults have reported poorer mental health during the third (vs. second) wave of the pandemic,³ it is unclear whether the associations between social experiences and PMH might have differed at different stages of the pandemic. It is also possible that those who experienced chronic (vs. transient) isolation or loneliness before and/or during the pandemic were at greater risk for poorer mental health outcomes.⁴⁵

Consistent with previous work,^{18,19,28} living alone status was used as an indicator of social isolation. Living alone status has been identified as a readily accessible and useful (albeit imperfect) measure of older adults' social isolation, particularly when using population-based data.²⁰ It may be an especially useful indicator in the context of the pandemic, when social interactions outside the household were limited.⁴ Indeed, older adults living alone (vs. with others) during the pandemic reported less social support⁴⁶ and in-person contact.⁴⁷

Nevertheless, living alone status does not provide a complete picture of an individual's

social connections.²⁰ Future work should consider additional indices of social isolation and integration (e.g. social participation, social network size, contact frequency, marital status), the mode of social connection (e.g. in-person, online)⁴⁸ and sources of support (e.g. spouse, children, friends)⁴⁹ to obtain a more comprehensive understanding of older adults' social experiences. Relatedly, the SCMHS only included a dichotomous single-item indicator of loneliness. Using more established (i.e. validated and widely used) and nuanced (e.g. multi-item, multiple response options) assessments of loneliness would allow for

cross-study comparisons,²⁶ and the assessment of varying degrees of loneliness (e.g. low, moderate, high).²⁷

The SCMH sampling frame excluded those living in institutions, who may have faced unique social isolation, loneliness and physical and mental health challenges.²¹ Thus, our study population likely includes a healthier subset of older adults. Nevertheless, our findings represent the majority of the population of interest, as 93% of older adults live in private dwellings.⁵⁰ Data availability and sample sizes also limited our ability to examine other socio-demographic groups that may be vulnerable to isolation, loneliness, or both (e.g. gender and sexual minorities, those with pre-existing mental and physical health problems or disabilities).^{21,33} Moreover, it is possible that results could have differed if we had statistically controlled for other potential confounding factors (e.g. mental illness). Relatedly, the SCMH included individual education level, which may differ from household education as a proxy for SES, and may have contributed to the differing pattern of PMH outcomes across education level groups.

Finally, although sampling weights were used for all estimates, nonresponse bias cannot be ruled out, due to the relatively low response rates of the SCMH surveys.

Conclusion

Already vulnerable to social isolation and loneliness and their associated health risks,¹² older adults were encouraged to further restrict in-person contacts due to heightened risk for negative outcomes stemming from contracting COVID-19.⁴ However, the impact of such restrictions on older adults' mental health have yet to be fully understood. Our findings indicate that, overall, social isolation and loneliness during times of heightened social restriction are associated with poorer PMH among older adults living in Canada. However, after taking loneliness and various sociodemographic characteristics into account, most associations between social isolation and PMH are no longer significant. By contrast, overall and in all sociodemographic groups examined, loneliness is associated with poorer PMH even after adjusting for social isolation and sociodemographic covariates, highlighting the need to appropriately identify and support lonely older adults during (and beyond) the pandemic.

Conflicts of interest

The authors have no conflicts of interest.

Authors' contributions and statement

LO conceived the project. LO and LL decided on the analytic approach. LL conducted the statistical analyses. All authors interpreted the results and LO drafted and revised the manuscript in response to feedback provided from LL, KR, GG and CC.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

References

1. Capaldi CA, Liu L, Dopko RL. Positive mental health and perceived change in mental health among adults in Canada during the second wave of the COVID-19 pandemic. *Health Promot Chronic Dis Prev Can.* 2021;41(11):359-77. <https://doi.org/10.24095/hpcdp.41.11.05>
2. Shields M, Tonmyr L, Gonzalez A, et al. Symptoms of major depressive disorder during the COVID-19 pandemic: results from a representative sample of the Canadian population. *Health Promot Chronic Dis Prev Can.* 2021;41(11):340-58. <https://doi.org/10.24095/hpcdp.41.11.04>
3. Capaldi CA, Liu L, Ooi LL, et al. At-a-glance – Self-rated mental health, community belonging, life satisfaction and perceived change in mental health among adults during the second and third waves of the COVID-19 pandemic in Canada. *Health Promot Chronic Dis Prev Can.* 2022;42(5):218-25. <https://doi.org/10.24095/hpcdp.42.5.05>
4. Statistics Canada. Impact of the COVID-19 pandemic on Canadian seniors [Internet]. Ottawa (ON): Statistics Canada; 2021 [cited 2022 Feb 4]. Available from: <https://www150.statcan.gc.ca/n1/en/pub/75-006-x/2021001/article/00008-eng.pdf?st=9aGEJZzE>
5. Raina P, Wolfson C, Griffith L, et al. A longitudinal analysis of the impact of the COVID-19 pandemic on the mental health of middle-aged and older adults from the Canadian Longitudinal Study on Aging. *Nat Aging.* 2021;1:1137-47. <https://doi.org/10.1038/s43587-021-00128-1>
6. Statistics Canada. Table 13-10-0806-01: Canadians' health and COVID-19, by age and gender [Internet]. Ottawa (ON): Statistics Canada; 2021 [cited 2022 Feb 15]. Available from: <https://doi.org/10.25318/1310080601-eng>
7. Statistics Canada. In the midst of high job vacancies and historically low unemployment, Canada faces record retirements from an aging labour force: number of seniors aged 65 and older grows six times faster than children 0-14 [Internet]. Ottawa (ON): Statistics Canada; 2022 [cited 2022 Apr 27]. Available from: <https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427a-eng.htm>
8. Webb LM, Chen CY. The COVID-19 pandemic's impact on older adults' mental health: contributing factors, coping strategies, and opportunities for improvement. *Int J Geriatr Psychiatry.* 2022;37(1):1-7. <https://doi.org/10.1002/gps.5647>
9. Holt-Lunstad J. A pandemic of social isolation? *World Psychiatry.* 2021;20(1):55-6. <https://doi.org/10.1002/wps.20839>
10. Cacioppo JT, Hawkley LC, Crawford LE, et al. Loneliness and health: potential mechanisms. *Psychosom Med.* 2002;64(3):407-17. <https://doi.org/10.1097/00006842-200205000-00005>
11. Courtin E, Knapp M. Social isolation, loneliness and health in old age: a scoping review. *Health Soc Care Community.* 2017;25(3):799-812. <https://doi.org/10.1111/hsc.12311>
12. Hämmig O. Health risks associated with social isolation in general and in young, middle and old age. *PLoS ONE.* 2019;14(7):e0219663. <https://doi.org/10.1371/journal.pone.0219663>

13. Srugo SA, Jiang Y, de Groh M. At-a-glance – Living arrangements and health status of seniors in the 2018 Canadian Community Health Survey. *Health Promot Chronic Dis Prev Can.* 2020;40(1):18-22. <https://doi.org/10.24095%2Fhpcdp.40.1.03>
14. Tang J, Galbraith N, Truong J. Living alone in Canada. [Insights on Canadian Society, 2019 Mar 6.] Ottawa (ON): Statistics Canada; 2019. [Catalogue No.: 75-006-X]. Available from: <https://www150.statcan.gc.ca/n1/pub/75-006-x/2019001/article/00003-eng.htm>
15. Gilmour H, Ramage-Morin PL. Social isolation and mortality among Canadian seniors. *Health Rep.* 2020;31(3):27-38. <https://doi.org/10.25318/82-003-x202000300003-eng>
16. World Health Organization. Social isolation and loneliness among older people: advocacy brief [Internet]. Geneva (CH): World Health Organization; 2021 [cited 2022 Mar 11]. Available from: <https://www.who.int/publications/i/item/9789240030749>
17. Public Health Agency of Canada. Aging and chronic diseases: a profile of Canadian seniors [Internet]. Ottawa (ON): PHAC; 2020 [cited 2022 Feb 4]. Available from: <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/aging-chronic-diseases-profile-canadian-seniors-report.html>
18. Bu F, Abell J, Zaninotto P, Fancourt D. A longitudinal analysis of loneliness, social isolation and falls amongst older people in England. *Sci Rep.* 2020;10:20064. <https://doi.org/10.1038/s41598-020-77104-z>
19. Ellwardt L, van Tilburg T, Aartsen M, Wittek R, Steverink N. Personal networks and mortality risk in older adults: a twenty-year longitudinal study. *PLoS ONE.* 2015;10(3):e0116731. <https://doi.org/10.1371/journal.pone.0116731>
20. Newall NE, Menec VH. A comparison of different definitions of social isolation using Canadian Longitudinal Study on Aging (CLSA) data. *Ageing Soc.* 2020;40(12):2671-94. <https://doi.org/10.1017/S0144686X19000801>
21. Federal/Provincial/Territorial Ministers Responsible for Seniors. Social isolation among older adults during the pandemic [Internet]. Ottawa (ON): Employment and Social Development Canada; 2021 [cited 2022 Apr 27]. Available from: <https://www.canada.ca/en/employment-social-development/corporate/seniors/forum/reports/covid19-social-isolation.html>
22. Statistics Canada. Canadian Health Survey on Seniors, 2020 [Internet]. Ottawa (ON): Statistics Canada; 2021 [cited 2022 Feb 21]. Available from: <https://www150.statcan.gc.ca/n1/daily-quotidien/211001/dq211001b-eng.htm?CMP=mstatcan>
23. Savage RD, Wu W, Li J, et al. Loneliness among older adults in the community during COVID-19: a cross-sectional survey in Canada. *BMJ Open.* 2021;11(4):e044517. <https://doi.org/10.1136/bmjopen-2020-044517>
24. Nicholson NR. A review of social isolation: an important but under-assessed condition in older adults. *J Prim Prev.* 2012;33(2-3):137-52. <https://doi.org/10.1007/s10935-012-0271-2>
25. Teater B, Chonody JM, Hannan K. Meeting social needs and loneliness in a time of social distancing under COVID-19: a comparison among young, middle, and older adults. *J Hum Behav Soc Environ.* 2021;31(1-4):43-59. <https://doi.org/10.1080/10911359.2020.1835777>
26. Park C, Majeed A, Gill H, et al. The effect of loneliness on distinct health outcomes: a comprehensive review and meta-analysis. *Psychiatry Res.* 2020;294:113514. <https://doi.org/10.1016/j.psychres.2020.113514>
27. Smith KJ, Victor C. Typologies of loneliness, living alone and social isolation, and their associations with physical and mental health. *Ageing Soc.* 2019;39(8):1709-30. <https://doi.org/10.1017/S0144686X18000132>
28. Beller J, Wagner A. Disentangling loneliness: differential effects of subjective loneliness, network quality, network size, and living alone on physical, mental, and cognitive health. *J Aging Health.* 2018;30(4): 521-39. <https://doi.org/10.1177/0898264316685843>
29. Coyle CE, Dugan E. Social isolation, loneliness and health among older adults. *J Aging Health.* 2012;24(8): 1346-63. <https://doi.org/10.1177/0898264312460275>
30. Menec VH, Newall NE, Mackenzi CS, Shoostari S, Nowicki S. Examining social isolation and loneliness in combination to social support and psychological distress using Canadian Longitudinal Study of Aging (CLSA) data. *PLoS ONE.* 2020;15(3): e0230673. <https://doi.org/10.1371/journal.pone.0230673>
31. Cornwell EY, Waite LJ. Social disconnectedness, perceived isolation, and health among older adults. *J Health Soc Behav.* 2009;50(1):31-48. <https://doi.org/10.1177/002214650905000103>
32. Public Health Agency of Canada, Centre for Surveillance and Applied Research. Positive Mental Health Surveillance Indicator Framework Quick Statistics, adults (18 years of age and older), Canada, 2022 Edition [Internet]. Ottawa (ON): PHAC; 2022 [cited 2022 Mar 28]. Available from: <https://health-infobase.canada.ca/positive-mental-health/PDFs/PMHSIF-2022-Quick-Stats-Adults.pdf>
33. National Seniors Council. Who's at risk and what can be done about it? A review of the literature on the social isolation of different groups of seniors [Internet]. Ottawa (ON): NSC; 2017 [cited 2022 Feb 7]. Available from: <https://www.canada.ca/en/national-seniors-council/programs/publications-reports/2017/review-social-isolation-seniors.html>
34. Uppal S, Barayandema A. Life satisfaction among Canadian seniors. [Insights on Canadian Society, 2018 Aug 2.] Ottawa (ON): Statistics Canada; 2018. [Catalogue No.: 75-006-X]. Available from: <https://www150.statcan.gc.ca/n1/en/pub/75-006-x/2018001/article/54977-eng.pdf?st=brmqzA15>
35. Statistics Canada. Canadian Social Survey: loneliness in Canada [Internet]. Ottawa (ON): Statistics Canada; 2021 [cited 2022 Apr 23]. Available from: <https://www150.statcan.gc.ca/n1/daily-quotidien/211124/dq211124e-eng.htm?CMP=mstatcan>

36. Statistics Canada. Survey on COVID-19 and Mental Health (SCMH): detailed information for September to December 2020 [Internet]. Ottawa (ON): Statistics Canada; 2020 [cited 2022 Apr 19]. Available from: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1283036>
37. Statistics Canada. Survey on COVID-19 and Mental Health (SCMH): detailed information for February to May 2021 [Internet]. Ottawa (ON): Statistics Canada; 2020 [cited 2022 Apr 19]. Available from: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5330>
38. Varin M, Palladino E, Lary T, Baker M. At-a-glance – An update on positive mental health among adults in Canada. *Health Promot Chronic Dis Prev Can.* 2020;40(3):86-91. <https://doi.org/10.24095/hpcdp.40.3.04>
39. Liu L, Capaldi CA, Dopko RL. Suicide ideation in Canada during the COVID-19 pandemic. *Health Promot Chronic Dis Prev Can.* 2021;41(11):378-91. <https://doi.org/10.24095/hpcdp.41.11.06>
40. Klinenberg E. Social isolation, loneliness, and living alone: identifying the risks for public health. *Am J Public Health.* 2016;106(5):786-7. <https://doi.org/10.2105/AJPH.2016.303166>
41. Freedman A, Nicolle J. Social isolation and loneliness: the new geriatric giants: approach for primary care. *Can Fam Physician.* 2020;66(3):176-82.
42. Vahia IV, Jeste DV, Reynolds CF III. Older adults and the mental health effects of COVID-19. *JAMA.* 2020; 324(22):2253-54. <https://doi.org/10.1001/jama.2020.21753>
43. Ma R, Mann F, Wang J, et al. The effectiveness of interventions for reducing subjective and objective social isolation among people with mental health problems: a systematic review. *Soc Psychiatry Psychiatr Epidemiol.* 2020;55(7):839-76. <https://doi.org/10.1007/s00127-019-01800-z>
44. Van Orden KA, Bower E, Lutz J, et al. Strategies to promote social connections among older adults during “social distancing” restrictions. *Am J Geriatr Psychiatry.* 2021;29(8):816-27. <https://doi.org/10.1016/j.jagp.2020.05.004>
45. Theeke LA. Sociodemographic and health-related risks for loneliness and outcome differences by loneliness status. *Res Gerontol Nurs.* 2010;3(2): 113-25. <https://doi.org/10.3928/19404921-20091103-99>
46. Frank K. COVID-19 and social support for seniors: do seniors have people they can depend on during difficult times? [StatCan COVID-19: Data to Insights for a Better Canada article series]. Ottawa (ON): Statistics Canada; 2020. [Catalogue No.: 45280001]. 7 p. Available from: <https://www150.statcan.gc.ca/n1/pub/45-28-0001/2020001/article/00007-eng.htm>
47. Fingerman KL, Ng YT, Zhang S, et al. Living alone during COVID-19: social contact and emotional well-being among older adults. *J Gerontol B Psychol Sci Soc Sci.* 2021;76(3): e116-e121. <https://doi.org/10.1093/geronb/gbaa200>
48. Skalacka K, Pajestka G. Digital or in-person: the relationship between mode of interpersonal communication during the COVID-19 pandemic and mental health in older adults from 27 countries. *J Fam Nurs.* 2021; 27(4):275-84. <https://doi.org/10.1177/10748407211031980>
49. Gariépy G, Honkaniemi H, Quesnel-Vallée A. Social support and protection from depression: systematic review of current findings in Western countries. *Br J Psychiatry.* 2016;209(4):284-93. <https://doi.org/10.1192/bjp.bp.115.169094>
50. Federal/Provincial/Territorial Ministers Responsible for Seniors. Report on housing needs of seniors [Internet]. Ottawa (ON): Employment and Social Development Canada; 2019 [cited 2022 May 16]. Available from: <https://www.canada.ca/en/employment-social-development/corporate/seniors/forum/report-seniors-housing-needs.html>

Original quantitative research

Access to mental health support, unmet need and preferences among adolescents during the first year of the COVID-19 pandemic

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Abstract

Introduction: The COVID-19 pandemic has had widespread effects on adolescent mental health. However, little is known about support-seeking, unmet need and preferences for mental health care among adolescents.

Methods: The Youth Development Instrument (YDI) is a school-administered survey of adolescents (N = 1928, mean age = 17.1, SD = 0.3) across British Columbia, Canada. In this cohort, we assessed the characteristics of accessed mental health supports, prevalence of unmet need and preferences for in-person versus internet-based services.

Results: Overall, 40% of adolescents obtained support for mental health, while 41% experienced unmet need. The most commonly accessed supports were family doctors or pediatricians (23.1%) and adults at school (20.6%). The most preferred mode of mental health care was in-person counselling (72.4%), followed by chat-based services (15.0%), phone call (8.1%) and video call (4.4%). The adjusted prevalence of accessing support was elevated among adolescents with anxiety (adjusted prevalence ratio [aPR] = 1.29, 95% CI: 1.10–1.51), those who used alcohol (1.14, 1.01–1.29), gender minorities (1.28, 1.03–1.58) and sexual minorities (1.28, 1.03–1.45). The adjusted prevalence of unmet need was elevated among adolescents with depression (1.90, 1.67–2.18), those with anxiety (1.78, 1.56–2.03), females (1.43, 1.31–1.58), gender minorities (1.45, 1.23–1.70) and sexual minorities (1.15, 1.07–1.23).

Conclusion: Adolescents of gender or sexual minority status and those with anxiety were more likely than others to have discussed mental health concerns and also to have reported unmet need. The most common sources of support were primary health care providers and adults at school, while the most and least preferred modes of support were in-person and video call services, respectively.

Keywords: *mental health services, unmet need, depression, anxiety, substance use*

Introduction

Adolescent mental health and substance use have been areas of substantial concern during the COVID-19 pandemic,¹ as

there have been documented increases in major depressive disorder, generalized anxiety, drinking and cannabis use since April 2020.^{2,3} During the pandemic, a substantial proportion of adolescents began

Highlights

- Among adolescents, during the COVID-19 pandemic, the most commonly accessed mental health supports were primary care providers and adults at school.
- The most preferred mode of mental health care was in-person counselling, while the least preferred mode was video calling.
- There was particular unmet need for mental health support among adolescents with depression, those with anxiety, gender minorities and sexual minorities.
- Future interventions should target these underserved groups, emphasizing the role of primary care, school-based interventions and in-person service options.

using substances primarily in solitude,³ and it is estimated that nearly half of teens experienced an increase in depressive or anxious symptoms.⁴

To date, a large body of literature has examined the characteristics associated with poor adolescent mental health during this period,⁵ identifying both risk and protective factors.^{1,6} Some studies have further examined access to mental health services during the pandemic through administrative records, including pediatric

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emergency department visits^{7,8} and specialist mental health referrals.^{9,10} These studies provide key information regarding mental health service provision during the pandemic, as they are not limited by response bias or participant recall. However, there is limited evidence surrounding access to less emergent or specialist forms of mental health support, such as family doctors or teachers.

Few studies have examined adolescents in the general population rather than solely adolescent patients included in administrative records.¹¹ This is an important gap, as administrative records do not allow for assessment of unmet need, since they include only adolescents who have already accessed care. Administrative records also do not allow for calculation of the prevalence of support-seeking in a general adolescent sample, since they are limited to patient participants and to particular forms of mental health support.

There is also limited evidence around adolescent perceptions of virtual mental health care, which rapidly increased during the pandemic.^{12,13} Despite virtual care becoming more accessible, it is unknown how adolescents feel about online services, or which forms of virtual support they most prefer. One online survey found that a majority of young people with internalizing disorders would be willing to consider virtual services;⁴ however, this study included young adults up to 29 years of age and did not measure actual access to support. Thus, despite the pandemic revealing vulnerabilities in youth mental health, there remain clear gaps in our understanding of adolescent support-seeking, unmet need and preferences regarding mental health services.

We therefore sought to assess the prevalence of accessing mental health support by adolescents in British Columbia during the first year of the COVID-19 pandemic, as well as characteristics associated with support-seeking and unmet mental health care needs. We further sought to identify the main sources of mental health support and the preferred delivery format for mental health services by adolescents during the first year of the COVID-19 pandemic. Using this information, we aimed to comment on the optimal setting, mode of delivery and target populations for adolescent mental health interventions during and after the pandemic period.

The context: school responses to COVID-19 in British Columbia

Unlike many other Canadian provinces and US states, British Columbia maintained mostly in-person learning throughout the winter and spring of 2021,¹⁴ allowing for in-person survey delivery. However, like elsewhere across the globe, adolescent extracurriculars, recreational activities and social gatherings were prohibited. In June 2020, the provincial government invested CAD 5 million towards the expansion of mental health resources,¹⁵ the majority of which went to developing e-mental health interventions.^{13,15,16} However, it is unknown how adolescents felt about this care model, or how well digital services served mental health needs.

Methods

Ethics approval

This study was approved by the UBC Behavioural Research Ethics Board.

Setting and participants

The Youth Development Instrument (YDI) is an in-school, computerized survey of secondary school students, conducted in partnership with select school districts in British Columbia (BC), the Human Early Learning Partnership at the University of British Columbia (HELP-UBC) and clinical, community, youth and government advisors. The YDI measures well-being and development in a general population sample of students enrolled at BC secondary schools. In this setting, schools maintained mostly in-person learning throughout the winter and spring of 2021, allowing for in-person survey delivery. From February to June 2021, high schools within selected school districts invited Grade 11 students to participate in the study during a designated delivery day or week. Due to small class sizes, one independent school additionally surveyed students in Grades 10 and 12 (n = 50). Overall, the mean age was 17.1 years (standard deviation = 0.3), with 99.9% of the sample falling between the ages of 16 and 18 years.

Procedures

Data for the YDI were collected from February to June 2021 and included all eligible students in six participating school districts and one independent high school. Two months prior to survey delivery,

participating schools were provided with an administration guide to maximize implementation consistency. At least one month prior to survey delivery, passive consent letters were distributed to student parents and guardians with the aim of limiting systemic selection bias. Students additionally provided assent after reviewing complete information about the study and having the opportunity to ask follow-up questions.

Most participants completed the survey online using school or personal devices during class hours. Four schools additionally emailed a link to a virtual survey for students who were absent during in-school delivery (n = 32). The survey was administered using the University of British Columbia Survey Tool hosted by Qualtrics, and took an average of 45 minutes to complete. All data were stored with Population Data BC, a multi-university data and education repository for individual-level data with robust privacy, confidentiality and security protocols.

Measures

Outcomes

Access to mental health support was assessed using the stem question “In the past 6 months, did you see or talk to anyone from the following places about any concerns you may have had about your mental health?” Response options were “Family doctor or pediatrician’s office,” “Walk-in clinic,” “Urgent care clinic, hospital or emergency room,” “Agency that provides mental health care or addiction services for children or adolescents,” “A psychiatrist, a psychologist, a social worker or some other type of counsellor” and “Teacher, adult or counsellor at school.” Students with a positive response to one or more of these options were categorized as having accessed a mental health support in the last six months.

Unmet mental health care need was assessed using the question “In the past 6 months, was there ever a time when you felt you might need professional help for mental health concerns (i.e. problems with emotions, attention, behaviours or use of drugs or alcohol) but you did not seek help?” Students who responded “Yes” were categorized as having unmet mental health care needs.

Additionally, students were asked to rank their preferred delivery format for receiving

mental health care, including in-person, phone call, Internet (including website and online chat/text) and video call.

Mental health and substance use indicators

Depression and anxiety were measured using validated screening tools used frequently in population surveys and clinical settings: the Patient Health Questionnaire 8 (PHQ-8) and the Generalized Anxiety Disorder Questionnaire 2 (GAD-2). Respondents who scored ≥ 10 on the PHQ-8 screened positive for depression, while those who scored ≥ 3 on the GAD-2 screened positive for anxiety.^{17,18} Alcohol and cannabis use were measured using the questions “How many times in the last 4 weeks have you drunk alcohol (wine, liquor, beer, coolers)?” and “How many times in the last 4 weeks have you smoked cannabis (marijuana)?” Potential responses included “Never done this,” “Not in the last 4 weeks,” “One or a few times,” “Weekly,” “Most days,” and “Almost every day.” Consistent with prior studies,^{8,19} any alcohol or cannabis use was defined using a cut-off of “One or a few times,” while near-daily alcohol or cannabis use was defined using a cut-off of “Most days.”^{19,20}

Demographic characteristics

Demographic characteristics included gender, ethnicity, sexual orientation and socioeconomic status. Gender was identified by asking participants “How do you describe your gender?”, with response options “Boy” (reference), “Girl” and “In another way.” Ethnicity was identified by asking participants to choose from a list of options consistent with those listed in the Canadian census. We used responses to this question to define three broad ethnicity categories: White (reference), Asian and Other. These categories were chosen because they were the largest ethnicity categories in our sample, as well as in British Columbia as a whole.²¹ An a priori decision to use three categories was made in light of sample size and methodological considerations around the need to preserve degrees of freedom in statistical analyses.

Sexual orientation was identified using the question stem “Do you identify as:” with response options “Heterosexual/straight,” “Gay/lesbian,” “Bisexual/pansexual,” “Asexual,” “Queer,” “Questioning/unsure” and “If none of the above (or if you would like to choose multiple categories), please specify: ___.” Due to sample

size considerations, sexual orientation was dichotomized to heterosexual and sexual minorities.

Socioeconomic status was measured using the revised six-item Family Affluence Scale, a continuous scale that has been validated in numerous youth samples.^{22,23}

Statistical analysis

As students were surveyed within their given high schools, the data in the current study were clustered by school. To account for this clustering, data were analyzed using a modified Poisson regression, as described by Zou et al.²⁴ This model specifies a log link function with a Poisson distribution and robust standard errors in order to approximate the risk ratio when outcome prevalence exceeds 20%, as is the case in the current study. As our study was cross-sectional, the use of modified Poisson regression allowed for the calculation of adjusted prevalence ratios, which describe the relative adjusted prevalence of an outcome in one exposure group versus another.

We tested the crude and adjusted associations of mental health conditions, substance use and demographic characteristics with (1) accessing any mental health care support and (2) reporting any unmet mental health care need during the COVID-19 pandemic. Mental health conditions included depression and anxiety, while substance use included past-month drinking and cannabis use. Demographic characteristics included gender (male, female, other), sexual orientation (heterosexual, sexual minority), ethnicity (White, Asian, other), and family affluence (continuous Family Affluence Scale score). Adjusted models controlled for all other mental health and demographic characteristics. Adjusted estimates were therefore derived from one of two models: one examining all predictors and having accessed mental health support, and one examining all predictors and self-identified unmet need. All statistical analyses were conducted using SAS version 9.4 (SAS Institute Inc., Cary, NC, US) and considered two-tailed differences of $p < 0.05$ statistically significant.

Results

Of the 3795 adolescents invited to participate in the study, 2350 completed the survey (response rate = 61.9%). After removing outliers (i.e. participants with average response times under 2 seconds,

$n = 44$) and those with missing exposure or outcome data ($n = 378$), the final sample included 1928 students (82.0% of all respondents) from 31 unique high school programs. Overall, included participants had a higher proportion of girls (47.5% vs. 37.3% among excluded participants) and higher scores on the Family Affluence Scale (3rd quartile = 38.6% vs. 31.8%, 4th quartile 17.2% vs. 13.5%). There were no other significant differences between included and excluded participants (data available upon request from the authors). Sample characteristics are presented in Table 1.

What was the prevalence of mental health conditions and substance use among adolescents during the COVID-19 pandemic?

Overall, 39.7% of the sample screened positively for depression, 43.7% screened positively for generalized anxiety, 26.8% reported using alcohol in the past month, 2.0% reported using alcohol near daily in the past month, 16.8% reported using cannabis in the past month and 7.3% reported using cannabis near daily in the past month. Among adolescents who drank in the past month, 7.4% did so on a near-daily basis, while among adolescents who smoked cannabis, 43.3% did so on a near-daily basis. Compared to males, depression and anxiety were more common among females (depression: 50.8% vs. 27.0%; anxiety: 60.3% vs. 25.8%) and gender minority students (depression: 79.6% vs. 27.0%; anxiety: 79.6% vs. 25.8%). Depression and anxiety were also more common among students who reported belonging to a sexual minority group compared to heterosexual students (depression: 65.1% vs. 32.6%; anxiety: 68.4% vs. 36.8%). A detailed breakdown of mental health and substance use by demographic characteristics is presented in Table 2.

What was the prevalence of accessing support and unmet mental health care need among adolescents? Which mode of mental health support was most preferred?

Of the sample, 40.3% accessed a mental health support in the past six months, while 59.7% did not. Similarly, 40.8% experienced unmet need for mental health care, while 59.2% did not. Mental health support was accessed by approximately half of those who screened positive for depression, anxiety, past-month drinking or past-month cannabis use. Unmet need

TABLE 1
Sample characteristics, Grade 11 adolescents in British Columbia, Canada, February to June, 2021

Characteristic	Frequency n (%)
Gender	
Male	959 (49.7)
Female	915 (47.5)
Gender minority	54 (2.8)
Ethnicity	
White	1040 (53.9)
Asian	462 (24.0)
Other	426 (22.1)
Sexuality	
Heterosexual	1510 (78.3)
Sexual minority	418 (21.7)
Family Affluence Score quartile^a	
Quartile 1	313 (16.2)
Quartile 2	539 (28.0)
Quartile 3	744 (38.6)
Quartile 4	332 (17.2)
Total	1928

Data source: Youth Development Instrument survey.

^a Higher quartiles indicate higher levels of family affluence.

was reported by nearly 70% of adolescents with depression or anxiety, 55% of adolescents with past-month drinking and 60% of adolescents with past-month cannabis use. Overall, the most commonly accessed supports were family doctors or pediatricians (23.1%); teachers, adults or counsellors at school (20.6%); and mental health professionals (14.9%). The most preferred mode of mental health care was in-person counselling (72.4%), followed by Internet (including website and online chat/text; 15.0%), phone call (8.1%) and video call (4.4%). A detailed breakdown of mental health support access and unmet need by mental health status is presented in Table 3.

Which adolescent characteristics were associated with accessing support?

In adjusted analyses, anxiety was associated with a 29% increase in the prevalence of accessing mental health support (adjusted prevalence ratio [aPR] = 1.29, 95% CI: 1.11–1.51), while alcohol use was associated with a 14% increase in the prevalence of accessing mental health support (1.14, 1.01–1.29). Neither depression (1.11, 0.96–1.28) nor cannabis use

TABLE 2
Prevalence of mental health and substance use by demographic characteristics among Grade 11 adolescents in British Columbia during the first year of the COVID-19 pandemic (N = 1928)

Characteristic	Frequency, n (%)					
	Depression	Anxiety	Past-month alcohol use		Past-month cannabis use	
			Any use	Near-daily use	Any use	Near-daily use
Gender						
Male	257 (27.0)	247 (25.8)	206 (21.5)	26 (2.7)	151 (15.7)	79 (8.2)
Female	465 (50.8)	552 (60.3)	298 (32.6)	12 (1.3)	160 (17.5)	58 (6.3)
Gender minority	43 (79.6)	43 (79.6)	13 (24.1)	0 (0.0)	12 (22.2)	3 (5.6)
Ethnicity						
White	427 (41.1)	481 (46.3)	346 (33.3)	21 (2.0)	199 (19.1)	81 (7.8)
Asian	142 (30.7)	155 (33.5)	36 (7.8)	3 (0.6)	21 (4.5)	5 (1.1)
Other	196 (46.0)	206 (48.4)	135 (31.7)	14 (3.3)	103 (24.2)	54 (12.7)
Sexuality						
Heterosexual	493 (32.6)	556 (36.8)	389 (25.8)	27 (1.8)	218 (14.4)	92 (6.1)
Sexual minority	272 (65.1)	286 (68.4)	128 (30.6)	11 (2.6)	105 (25.1)	48 (11.5)
Family affluence score quartile^a						
Quartile 1	138 (44.1)	147 (47.0)	77 (24.6)	9 (2.9)	75 (24.0)	37 (11.8)
Quartile 2	233 (43.2)	244 (45.3)	138 (25.6)	6 (1.1)	95 (17.6)	42 (7.8)
Quartile 3	269 (36.2)	309 (41.5)	198 (26.6)	13 (1.7)	109 (14.7)	47 (6.3)
Quartile 4	125 (37.7)	142 (42.8)	104 (31.3)	10 (3.0)	44 (13.3)	14 (4.2)
Total	765 (39.7)	842 (43.7)	517 (26.8)	38 (2.0)	323 (16.8)	140 (7.3)

Data source: Youth Development Instrument survey.

^a Higher quartiles indicate higher levels of family affluence.

TABLE 3
Prevalence of accessing mental health care services and unmet need among adolescents with mental health concerns during the first year of the COVID-19 pandemic

	Frequency, n (%)				Total
	Depression	Anxiety	Past-month alcohol use	Past-month cannabis use	
Accessed any mental health services	386 (50.5)	430 (51.1)	254 (49.1)	168 (52.0)	777 (40.3)
Type of service accessed^a					
Family doctor or pediatrician	216 (28.8)	240 (29.0)	149 (29.3)	97 (30.5)	440 (23.1)
Walk-in clinic	109 (14.7)	113 (13.8)	80 (15.8)	62 (19.6)	218 (11.5)
Urgent care clinic, hospital or emergency room	78 (10.6)	78 (9.6)	63 (12.5)	42 (13.3)	144 (7.6)
Youth mental health agency	100 (13.7)	105 (13.0)	58 (11.6)	47 (14.9)	145 (7.7)
Psychiatrist, psychologist or social worker	192 (25.6)	199 (24.1)	108 (21.4)	77 (24.2)	283 (14.9)
Teacher, adult or school counsellor	204 (27.2)	221 (26.6)	135 (26.4)	86 (27.0)	392 (20.6)
Number of services accessed					
0 services	379 (49.5)	412 (48.9)	263 (50.9)	155 (48.0)	1151 (59.7)
1 service	152 (19.9)	180 (21.4)	98 (19.0)	60 (18.6)	355 (18.4)
2 services	77 (10.1)	95 (11.3)	55 (10.6)	34 (10.5)	183 (9.5)
3+ services	157 (20.5)	155 (18.4)	101 (19.5)	74 (22.9)	239 (12.4)
Reported unmet need for mental health services	535 (69.9)	564 (67.0)	284 (54.9)	190 (58.8)	787 (40.8)
Preferred mode of mental health care					
In-person	376 (72.9)	427 (72.9)	254 (75.1)	164 (75.2)	949 (72.4)
Phone call	43 (8.3)	42 (7.2)	33 (9.8)	16 (7.3)	106 (8.1)
Website, online chat or text	78 (15.1)	88 (15.0)	35 (10.4)	31 (14.2)	197 (15.0)
Video call	19 (3.7)	29 (4.9)	16 (4.7)	7 (3.2)	58 (4.4)
Total	765 (39.7)	842 (43.7)	517 (26.8)	323 (16.8)	1928

Data source: Youth Development Instrument survey.

^a Cells may not add to totals due to the ability of participants to choose multiple options, and to missing data.

(1.12, 0.96–1.31) was significantly associated with accessing mental health support (Table 4).

With respect to demographic characteristics, gender minority status was associated with a 28% increase in the prevalence of accessing mental health support compared to males (aPR = 1.28, 95% CI: 1.03–1.59), while sexual minority status was associated with a 23% increase in accessing support compared to heterosexuals (1.23, 1.04–1.45). The adjusted prevalence of accessing mental health support was not significantly elevated among females compared to males (1.17, 1.00–1.38), minority ethnicities (Asian vs. White: 0.92, 0.78–1.08; Other vs. White: 1.02, 0.90–1.16) or adolescents with lower family affluence (0.99, 0.96–1.01; Table 4).

Which adolescent characteristics were associated with unmet mental health care needs?

In adjusted analyses, depression was associated with a 90% increase in the

prevalence of reporting unmet need (aPR = 1.91, 95% CI: 1.67–2.18), while anxiety was associated with a 78% increase in the prevalence of reporting unmet need (1.78, 1.55–2.03). Neither alcohol use (1.11, 0.98–1.25) nor cannabis use (1.09, 0.97–1.22) was significantly associated with unmet need for mental health care (Table 4).

With respect to demographic characteristics, the prevalence of unmet need for mental health support was 43% higher among females compared to males (aPR = 1.43, 95% CI: 1.30–1.58), 45% higher among gender minority adolescents compared to males (1.45, 1.23–1.70) and 15% higher among sexual minorities compared to heterosexual students (1.15, 1.08–1.23). Compared to White students, Asian students had a 33% lower prevalence of unmet need (0.67, 0.60–0.76). The prevalence of unmet need was not significantly different for other minority ethnicities (0.98, 0.92–1.04) or adolescents with lower family affluence (0.99, 0.97–1.01; Table 4).

Discussion

This study examined the association of varying mental health and demographic characteristics with (1) accessing mental health support, and (2) experiencing unmet need for mental health care among adolescents in BC, Canada, during the COVID-19 pandemic.

In addition to examining access and unmet need, we descriptively examined which forms of mental health support were most commonly used, and which modes of mental health care were most preferable to adolescents. We highlight five major findings:

1. Symptoms of depression and anxiety were extremely common, with approximately 40% of adolescents screening positive for each of these conditions. High-frequency cannabis use was also common, with 43% of adolescents who used cannabis in the past month reporting smoking on a near-daily basis.

TABLE 4
Prevalence ratios for accessing mental health care services and reporting unmet need among adolescents during the first year of the COVID-19 pandemic

	Prevalence ratio, n (95% CI)			
	Outcome			
	Accessing services		Unmet need	
	Unadjusted	Adjusted ^a	Unadjusted	Adjusted ^a
Mental health concerns				
Depression	1.50 (1.37–1.64)**	1.11 (0.96–1.28)	3.23 (2.86–3.64)**	1.91 (1.67–2.18)**
Anxiety	1.60 (1.47–1.74)**	1.29 (1.11–1.51)**	3.26 (2.89–3.68)**	1.78 (1.55–2.03)**
Alcohol use	1.33 (1.20–1.46)**	1.14 (1.01–1.29)*	1.54 (1.32–1.80)**	1.11 (0.98–1.25)
Cannabis use	1.37 (1.22–1.54)**	1.12 (0.96–1.31)	1.58 (1.36–1.83)**	1.09 (0.97–1.22)
Demographic characteristics				
Gender				
Female vs. male	1.39 (1.24–1.56)**	1.17 (1.00–1.38)	2.16 (1.89–2.47)**	1.43 (1.30–1.58)**
Gender minority vs. male	1.89 (1.53–2.35)**	1.28 (1.03–1.59)*	3.14 (2.53–3.90)**	1.45 (1.23–1.70)**
Ethnicity				
Asian vs. White	0.79 (0.68–0.93)**	0.92 (0.78–1.08)	0.53 (0.45–0.63)**	0.67 (0.60–0.76)**
Other vs. White	1.07 (0.94–1.22)	1.02 (0.90–1.16)	1.06 (0.97–1.17)	0.98 (0.92–1.04)
Sexual orientation				
Sexual minority vs. heterosexual	1.52 (1.32–1.74)**	1.23 (1.04–1.45)*	1.95 (1.79–2.13)**	1.15 (1.08–1.23)**
Family affluence^b	0.98 (0.94–1.01)	0.99 (0.96–1.01)	0.97 (0.94–1.00)	0.99 (0.97–1.01)

Data source: Youth Development Instrument survey.

Abbreviation: CI, confidence interval.

^a Adjusted for depression, anxiety, alcohol use, cannabis use, gender, ethnicity, sexual orientation and family affluence score.

^b Higher quartiles indicate higher levels of family affluence.

* $p < 0.05$.

** $p < 0.01$.

- The most commonly accessed mental health supports were family doctors or pediatricians, followed by adults at school, highlighting the importance of primary care and school-based interventions in addressing adolescent mental health.
- The most preferred mode of mental health care delivery was in-person (72%), while the least preferred mode was video call (4%), suggesting that video call-based counselling services may not be the ideal e-health intervention for addressing adolescent needs.
- Adjusting for covariates, the rate of accessing mental health support was significantly elevated among adolescents with anxiety, past-month drinking, gender minority status and nonheterosexual orientation.
- Adjusting for covariates, the rate of unmet mental health need was significantly elevated among adolescents with depression, anxiety, female gender, nonbinary gender and nonheterosexual

orientation, suggesting that these groups are in need of more targeted mental health intervention during the pandemic.

Overall, our results suggest a number of important recommendations for developing mental health interventions aimed at adolescents during and after the COVID-19 pandemic.

First, in order to reach the broadest range of youth, this study suggests that interventions should focus on primary care and school settings. Consistent with prior literature,^{25–27} we found family physicians, pediatricians, teachers and school counsellors to be the most common sources of mental health support for adolescents. It is important that primary care providers be aware of this important role in adolescents' lives, and screen for mental health problems accordingly. Our finding that adults at school were common sources of mental health support may have been, in part, due to the relative inaccessibility of

professional counselling services and the continuation of in-person classes in British Columbia during the pandemic. As stated above, British Columbia maintained mostly in-person learning throughout the winter and spring of 2021,¹⁴ potentially mitigating some of the social isolation due to online-only learning for many secondary school students.²⁸ Nevertheless, rates of mental health problems were high in this sample, with nearly half of adolescents screening positively for anxiety or depression. Like primary care physicians, teachers and school counsellors remain an extremely important source of support for adolescents. Maintaining the availability of this support should be prioritized during and after the pandemic.

Second, our study provides recommendations regarding the mode of mental health care delivery best suited to adolescent populations. After in-person care, the most popular forms of service delivery were chat-based communication (including website, online chat and text) and phone calls.

The least preferred form of service delivery was video call, a finding that was consistent across adolescents with varying mental health concerns. Ironically, at the start of the pandemic in British Columbia, video call-based services saw some of the largest growth in funding and accessibility for adolescents.^{13,15,16} This study suggests that text- and phone-based services may appeal to a wider range of this population.

Third, our results help provide recommendations for targeting and better customizing youth mental health interventions. Accessing mental health support was associated with anxiety, minority gender status and nonheterosexual orientation. However, experiencing unmet need for services was correlated with depression, anxiety, female gender, gender minority status and nonheterosexual orientation. These groups are consistent with those in other studies who suffered the greatest mental health consequences due to the COVID-19 pandemic.^{4,5,29-31} This study further suggests that many of these adolescents are not accessing desired care, particularly females and those with depression, who were more likely than others to report unmet need but not more likely to access care.

Strengths and limitations

To our knowledge, this is one of the only studies to examine primary support-seeking by a general population sample of adolescents during the pandemic, or to assess self-identified unmet need for services.

Still, this study has several limitations. First, although all eligible students in participating secondary schools were included in the sampling frame, our initial sample of schools was drawn on the basis of convenience and included primarily adolescents aged 17. Therefore, this sample was not representative of the entire BC adolescent population. Additionally, it is possible that there was some response bias in favour of females and adolescents with higher family affluence scores, as these groups were less likely to have missing data in our sample. Still, the effect size of these differences was small, and there were no significant differences by ethnicity, sexuality, depression status, anxiety status, past-month alcohol use or past-month cannabis use.

Second, students were asked to recall whether they had accessed support or felt unmet need in the past six months, creating the potential for recall bias. It is possible that adolescents with symptoms of depression or anxiety were more likely to remember speaking to an adult about their problems. Some students may have underestimated their past-month substance use frequency, and we may not have accurately captured students who did not recognize their need for mental health support.

Third, while mood disorders were measured over the prior two weeks, support access and unmet need were measured over the prior six months. Students who received successful care, or recovered from mental health problems without receipt of care, were categorized as screening negatively for mental health problems in our dataset. Future studies should use longitudinal data to compare the relative success of different mental health supports.

Fourth, some students may have misreported information due to social desirability bias or fear of repercussions. To mitigate this, students were assured that their data would not be shared with their peers, parents or schools and were informed of safeguards used to ensure the privacy and security of their responses.

Fifth, since the study setting had only minor school closures during the COVID-19 pandemic, results may not be generalizable to adolescents who completed school from home throughout the pandemic. However, if in-person schooling is believed to be protective against poor mental health outcomes, our results may be interpreted as underestimating unmet need.

Conclusion

During the COVID-19 pandemic, adolescents with depression, anxiety, female gender, gender minority status and nonheterosexual orientation were at particular risk of experiencing mental health problems and unmet need. Future interventions should aim to expand outreach to these underserved groups, emphasizing the role of primary care, school-based interventions and in-person services. Virtual interventions should offer phone- and chat-based services, which were consistently more preferable to adolescents than video calling.

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Conflicts of interest

The authors have no conflicts of interest relevant to this article to disclose.

Authors' contributions and statement

Study design and conceptualization by LG; data acquisition and study implementation by GS, MC, JW and HS; data analysis, preparation and interpretation by LG, GS and DL; manuscript drafting and revising by LG, GS, DL, MC, JW, MG, KSR and HS.

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References

1. Panchal U, Salazar de Pablo G, Franco M, et al. The impact of COVID-19 lockdown on child and adolescent mental health: systematic review. *Eur Child Adolesc Psychiatry*. 2021. <https://doi.org/10.1007/s00787-021-01856-w>
2. Hawke LD, Barbic SP, Voineskos A, et al. Impacts of COVID-19 on youth mental health, substance use, and well-being: a rapid survey of clinical and community samples. *Can J Psychiatry*. 2020;65(10):701-9. <https://doi.org/10.1177/0706743720940562>
3. Dumas TM, Ellis W, Litt DM. What does adolescent substance use look like during the COVID-19 pandemic? Examining changes in frequency, social contexts, and pandemic-related predictors. *J Adolesc Health* 2020;67(3):354-61. <https://doi.org/10.1016/j.jadohealth.2020.06.018>
4. Cost KT, Crosbie J, Anagnostou E, et al. Mostly worse, occasionally better: impact of COVID-19 pandemic on the mental health of Canadian children and adolescents. *Eur Child Adolesc Psychiatry*. 2022;31(4):671-84. <https://doi.org/10.1007/s00787-021-01744-3>

5. Magson NR, Freeman JYA, Rapee RM, Richardson CE, Oar EL, Fardouly J. Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *J Youth Adolesc.* 2021;50(1):44-57. <https://doi.org/10.1007/s10964-020-01332-9>
6. Jackson SB, Stevenson KT, Larson LR, Peterson MN, Seekamp E. Outdoor activity participation improves adolescents' mental health and well-being during the COVID-19 pandemic. *Int J Environ Res Public Health.* 2021;18(5):2506. <https://doi.org/10.3390/ijerph18052506>
7. DeLaroche AM, Rodean J, Aronson PL, et al. Pediatric emergency department visits at US children's hospitals during the COVID-19 pandemic. *Pediatrics.* 2021;147(4):e2020039628. <https://doi.org/10.1542/peds.2020-039628>
8. Kostopoulou E, Gkentzi D, Papasotiriou M, et al. The impact of COVID-19 on paediatric emergency department visits. A one-year retrospective study. *Pediatr Res.* 2022;91(5):1257-62. <https://doi.org/10.1038/s41390-021-01815-w>
9. Stewart SL, Vasudeva AS, Van Dyke JN, Poss JW. Child and youth mental health needs and service utilization during COVID-19. *Traumatology.* 2022; 28(3):311-24. <https://doi.org/10.1037/trm0000345>
10. Saunders NR, Kurdyak P, Stukel TA, et al. Utilization of physician-based mental health care services among children and adolescents before and during the COVID-19 pandemic in Ontario, Canada. *JAMA Pediatr.* 2022; 176(4):e216298. <https://doi.org/10.1001/jamapediatrics.2021.6298>
11. Solmi M, Cortese S, Correll CU. Editorial perspective: challenges of research focusing on child and adolescent mental health during the COVID-19 era: what studies are needed? *J Child Psychol Psychiatry.* 2022; 63(1):122-5. <https://doi.org/10.1111/jcpp.13478>
12. Centers for Disease Control and Prevention (CDC). Using telehealth to expand access to essential health services during the COVID-19 pandemic [Internet]. Atlanta (GA): CDC; 2020 [cited 2022 Aug 10]. Available from: <https://public4.pagefreezer.com/browse/CDC%20Covid%20Pages/11-05-2022T12:30/https://www.cdc.gov/coronavirus/2019-ncov/hcp/telehealth.html>
13. Canadian Institute for Health Information (CIHI). Physician billing codes in response to COVID-19 [Internet]. Ottawa (ON): CIHI; 2021 [cited 2022 Aug 10]. Available from: <https://www.cihi.ca/en/physician-billing-codes-in-response-to-covid-19>
14. Ministry of Education and Child Care. Health, safety remain focus for new school year [Internet]. Victoria (BC): Government of British Columbia; 2021 [cited 2021 Aug 25]. Available from: <https://news.gov.bc.ca/releases/2021EDUC0058-001663>
15. CBC News. B.C. spending \$5M to boost virtual mental-health services. *CBC News* [Internet]. 2020 Apr 9 [cited 2022 Aug 10]. Available from: <https://www.cbc.ca/news/canada/british-columbia/covid-19-bc-mental-health-bc-1.5527661#:~:text=B.C.%20is%20spending%20%245%20million,heavily%20on%20the%20population's%20shoulders>
16. Zenone MA, Cianfrone M, Sharma R, et al. Supporting youth 12-24 during the COVID-19 pandemic: how Foundry is mobilizing to provide information, resources and hope across the province of British Columbia. *Glob Health Promot.* 2021;28(1):51-9. <https://doi.org/10.1177/1757975920984196>
17. Kroenke K, Strine TW, Spitzer RL, Williams JB, Berry JT, Mokdad AH. The PHQ-8 as a measure of current depression in the general population. *J Affect Disord.* 2009;114(1-3):163-73. <https://doi.org/10.1016/j.jad.2008.06.026>
18. Plummer F, Manea L, Trepel D, McMillan D. Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. *Gen Hosp Psychiatry.* 2016;39:24-31. <https://doi.org/10.1016/j.genhosppsych.2015.11.005>
19. Substance Abuse and Mental Health Services Administration. 2019 National Survey on Drug Use and Health detailed tables [Internet]. US Department of Health & Human Services; 2020 [cited 2021 Aug 29]. Available from: <https://www.samhsa.gov/data/report/2019-nsduh-detailed-tables>
20. Gorfinkel LR, Stohl M, Hasin D. Association of depression with past-month cannabis use among US adults aged 20 to 59 years, 2005 to 2016. *JAMA Netw Open.* 2020;3(8):e2013802. <https://doi.org/10.1001/jamanetworkopen.2020.13802>
21. Statistics Canada. Census profile, 2016 Census: British Columbia [Internet]. Ottawa (ON): Statistics Canada; 2017 [cited 2022 Oct 6]. Available from: <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=59&Geo2=PR&Code2=01&SearchText=Canada&SearchType=Begin&SearchPR=01&B1=All&type=0>
22. Boudreau B, Poulin C. An examination of the validity of the Family Affluence Scale II (FAS II) in a general adolescent population of Canada. *Soc Ind Res.* 2009;94(1):29-42. <https://doi.org/10.1007/s11205-008-9334-4>
23. Torsheim T, Cavallo F, Levin KA, et al. Psychometric validation of the revised Family Affluence Scale: a latent variable approach. *Child Indic Res.* 2016;9:771-84. <https://doi.org/10.1007/s12187-015-9339-x>
24. Zou GY, Donner A. Extension of the modified Poisson regression model to prospective studies with correlated binary data. *Stat Methods Med Res.* 2013;22(6):661-70. <https://doi.org/10.1177/0962280211427759>
25. Farmer EM, Burns BJ, Phillips SD, Angold A, Costello EJ. Pathways into and through mental health services for children and adolescents. *Psychiatr Serv.* 2003;54(1):60-6. <https://doi.org/10.1176/appi.ps.54.1.60>
26. Gilbert A, Maheux B, Frappier JY, Haley N. Adolescent care. Part 1: are family physicians caring for adolescents' mental health? *Can Fam Physician.* 2006;52(11):1440-1.

-
27. Costello EJ, He JP, Sampson NA, Kessler RC, Merikangas KR. Services for adolescents with psychiatric disorders: 12-month data from the National Comorbidity Survey-Adolescent. *Psychiatr Serv.* 2014;65(3):359-66. <https://doi.org/10.1176/appi.ps.201100518>
 28. Golberstein E, Wen H, Miller BF. Coronavirus disease 2019 (COVID-19) and mental health for children and adolescents. *JAMA Pediatr.* 2020; 174(9):819-20. <https://doi.org/10.1001/jamapediatrics.2020.1456>
 29. Hawke LD, Hayes E, Darnay K, Henderson J. Mental health among transgender and gender diverse youth: an exploration of effects during the COVID-19 pandemic. *Psychol Sex Orientat Gend Divers.* 2021;8(2):180-7. <https://doi.org/10.1037/sgd0000467>
 30. Jones EAK, Mitra AK, Bhuiyan AR. Impact of COVID-19 on mental health in adolescents: a systematic review. *Int J Environ Res Public Health.* 2021; 18(5):2470. <https://doi.org/10.3390/ijerph18052470>
 31. Ravens-Sieberer U, Kaman A, Erhart M, et al. Quality of life and mental health in children and adolescents during the first year of the COVID-19 pandemic: results of a two-wave nationwide population-based study. *Eur Child Adolesc Psychiatry.* 2021. <https://doi.org/10.1007/s00787-021-01889-1>

Original quantitative research

Association between annual exposure to air pollution and systolic blood pressure among adolescents in Montréal, Canada

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Abstract

Introduction: In adults, chronic exposure to air pollution is associated with elevated blood pressure, but few studies have examined this relationship in youth. We investigated the association between annual ambient concentrations of air pollutants (fine particulate matter [PM_{2.5}] and nitrogen dioxide [NO₂]) and systolic blood pressure (SBP) among adolescents in Montréal, Canada.

Methods: Participants were students aged 15 to 17 years who provided SBP and residential postal code data in 2004/05 through their enrolment in the Nicotine Dependence in Teens study. Annual estimates for 2004 of residential exposure to NO₂ and PM_{2.5} were provided by the Canadian Urban Environmental Health Research Consortium and linked to participants' residential postal code. Elevated SBP was defined as SBP ≥ 90th percentile adjusted for age, sex and height. Logistic regression was used to estimate odds ratios and 95% confidence intervals (CIs) for each pollutant with respect to elevated SBP, adjusted for relevant confounders.

Results: The sample consisted of 508 adolescents (mean age: 16.9, 46% male); 4% had elevated SBP. Although estimates were not statistically significant, there were generally modest positive associations between pollutant levels and SBP. The adjusted prevalence odds ratio of elevated SBP was 1.33 (95% CI: 0.64, 3.05) for every interquartile range (IQR) increase in residential PM_{2.5} levels (2.1µg/m³). Similarly, the adjusted prevalence odds ratio of elevated SBP was 1.17 (95% CI: 0.47, 2.70) for every IQR increase in residential NO₂ levels (10.2 ppb).

Conclusion: Findings support a possible relationship between exposure to air pollutants and increased SBP in adolescents, warranting further investigation for this important public health concern.

Keywords: *chronic disease prevention, blood pressure, air pollution, adolescent, health equity, cohort study*

Introduction

Elevated blood pressure (BP) has long been recognized as a major health burden and a major risk factor for stroke, cardiovascular

disease (CVD), end-stage renal disease and overall mortality.¹ In youth, primary hypertension (HTN), defined as elevated BP with no identifiable cause, is more common in older children and adolescents

Highlights

- Our cohort study investigated the relation between air pollution exposure and systolic blood pressure in a Quebec adolescent population.
- Adolescents living in more polluted areas reported lower levels of physical activity and greater cigarette use in the past three months, and had greater material and social deprivation, than those living in the less polluted areas.
- Results cannot exclude a meaningful association between long-term exposure to air pollution and the prevalence of elevated systolic blood pressure in Montréal adolescents.

than in younger children.² The prevalence of this condition is estimated to be between 3% and 5% in the United States and may be higher in certain ethnic groups such as Blacks and Latin Americans.³ Data on BP trajectories from childhood to adulthood illustrate that higher BP in childhood is associated with higher BP in adulthood and the onset of HTN in young adulthood.⁴

Moreover, normal BP in childhood is inversely associated with HTN in mid-adulthood.¹ This relationship is stronger in older children and adolescents.⁵ The goal of early identification and management of elevated BP in children and

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adolescents is to prevent the development of HTN-related end-organ disease, including CVD, later in life.⁶ Both elevated BP (previously referred to as “pre-HTN”) and HTN in youth are underdiagnosed,⁷ further contributing to the elevated risk of poor cardiovascular outcomes in adulthood.

Air pollution, and more specifically, short- and long-term exposure to fine particulate matter (PM_{2.5}), is associated with increases in arterial BP values in adults with pre-existing health conditions,^{8,9} as well as with incident HTN in otherwise healthy Canadian adults.¹⁰ A recent meta-analysis demonstrated that long-term exposure to PM_{2.5} and nitrogen dioxide (NO₂) was associated with systolic blood pressure (SBP) values in children.¹¹ Air pollution is hypothesized to influence BP through biphasic increases consisting of an initial response within minutes to hours, due to acute autonomic nervous system imbalance,¹² and subsequent BP elevation due to increased arterial vasoconstriction responsiveness¹³ caused by endothelial dysfunction, oxidative stress and inflammation.⁸

With high levels of industrialization and motorized vehicle use in developed countries, air pollution and its public health impacts have elevated concern among environmental health researchers, environmental regulatory agencies and the public.¹⁴ Common outdoor air pollutants of considerable concern in adults include PM_{2.5} and NO₂, and in urban areas, traffic-related sources including gasoline-fuelled or diesel-fuelled transportation methods represent the dominant sources.¹⁴ Better understanding of the extent to which these air pollutants affect human health is pivotal for decision-makers to implement appropriate regulations and public health policies.

Objective

Previous studies examining the relationship between chronic air pollution and BP in children have reported inconsistent findings, and none have specifically focussed on adolescents in North America.¹⁵⁻¹⁸ Given that elevated BP during adolescence in particular is a risk factor for HTN and CVD in adulthood, the objective of this study was to investigate the association between annual residential concentrations of two outdoor ambient air pollutants (PM_{2.5} and NO₂) and SBP among Grade 11 students from 10 public high schools in

Montréal, Canada, all of which were measured in 2004/05.

Methods

Ethics approval

The study received ethics approval from the Montréal Department of Public Health Ethics Review Committee, the McGill University Faculty of Medicine Institutional Review Board (A05-M48-02A) and the Ethics Research Committee of the Centre de recherche du Centre hospitalier de l'Université de Montréal (ND 06.087). Informed consent was obtained from all individual participants included in the Nicotine Dependence in Teens study.

Study design

We undertook an analysis of data from the Nicotine Dependence in Teens (NDIT) study, for which a detailed description of the data collection has been previously published.¹⁹ Briefly, the original sample included 1294 Grade 7 students (response proportion: 54%) recruited in 1999/2000 in a purposive sample of 10 public high schools in and around Montréal, Quebec. The sample of students was similar at baseline to a 1999 provincially representative sample of children aged 12 years in Quebec.²⁰ NDIT schools were selected to include a mix of (1) English and French language schools; (2) urban, suburban and rural schools; and (3) schools located in high, medium and low socioeconomic status (SES) neighbourhoods. NDIT data collection consisted primarily of self-report questionnaires completed at school by students every three months from Grade 7 to 11 (1999–2005), for a total of 20 cycles during high school. Anthropometric characteristics and BP were measured during cycles 1, 12 and 19.

For the current study, we analyzed data from Grade 11 students aged under 18 years who completed cycle 19 in 2004/05 and for whom BP measures and postal code data were available. Participants whose residential postal codes were located outside the census division from the location in which nitrogen dioxide (NO₂) concentrations were estimated were excluded, since the estimates are inaccurate with respect to individual residential exposure. While research has shown that residential estimates of NO₂ are valid measures of individual exposure for those

living close to roads,²¹ this has not been established for those living further away.

Data sources

Using participant-reported, six-digit residential postal codes from NDIT questionnaires, neighbourhood and air quality data were obtained from the Canadian Urban Environmental Health Research Consortium (CANUE). In urban areas, six-digit residential postal codes most often correspond to one side of a city block or to a single apartment building; in rural areas, a single postal code may represent a larger area.²² In the NDIT dataset, one of 10 study schools was located in a rural area; the other nine schools were located in suburban and urban areas. Postal code data were provided by DMTI Spatial Inc., via CANUE under the current SMART Agreement with Canadian universities. For our analysis, we extracted postal code-defined environmental (e.g. air quality) and neighbourhood (e.g. material and social deprivation) data using the coordinate locations from the CanMap Postal Code Suite version 2015.3 (DMTI Spatial, Inc., Markham, ON, CA).

Blood pressure

SBP was measured by trained technicians using standardized methods.²³ Participants rested for five minutes before BP was assessed; the measurement was taken while the participant was sitting, using an oscillometric device (Dinamap XL, model CR9340, Critikon, Inc., Tampa, FL, US), on the right arm, using an appropriate cuff size selected according to arm circumference. Aligned with Canadian pediatric guidelines,²⁴ SBP percentiles adjusted for age, sex and height were calculated using the natural spline quantile regression model developed by Rosner et al.²⁵ SBP was considered to be elevated when SBP was \geq 90th percentile adjusted for age, sex and height, as there is no consensus on cut-offs for elevated BP for adolescents in Canadian guidelines.²⁴

Air quality exposures

Two outdoor air quality measures provided by CANUE and linked to NDIT participants' six-digit residential postal codes were investigated: PM_{2.5} and NO₂. Ground-level PM_{2.5} in 2004 was estimated by combining a 0.01-degree \times 0.01-degree resolution optimal estimate-based aerosol optical depth retrieval from the NASA

MODIS instrument with aerosol vertical profile and scattering properties simulated by the GEOS-Chem chemical transport model.²⁶ A geographically weighted regression that incorporates ground-based observations was then applied to adjust for any residual bias in the satellite-derived PM_{2.5} estimates.²⁶ The annual PM_{2.5} estimates used in this analysis have a spatial resolution of about one kilometre. Residential exposures to 2004 annual mean concentrations of NO₂ were estimated using a national land-use regression model (LUR) developed from National Air Pollution Surveillance monitoring data using methods reported by Hystad et al.²⁷ The model explained 73% of the variation in observed National Air Pollution Surveillance measurements with a root mean square error of 2.9 ppb.

Covariates

Body mass index (BMI) percentiles based on the World Health Organization (WHO) growth curves, number of bouts per week of moderate-to-vigorous physical activity (MVPA) and alcohol and cigarette consumption in the past three months were considered as confounders and were measured in the same cycle as SBP. Material and social deprivation indexes based on the 2001 Canadian census derived from Pampalon et al.,²⁸ parental education, ethnicity and country of birth were collected during earlier NDIT cycles and were also adjusted for in the models (available from the authors upon request).

Statistical analyses

Missing data for cigarette consumption (2.2%), material and social deprivation index (1.7%), alcohol consumption (0.6%), parental education (1.8%) and ethnicity (10.8%) were imputed using the nearest neighbour method (data available from the authors upon request).²⁹ Logistic regression models were used to quantify the relationship between each air quality index measure (NO₂, PM_{2.5}) with SBP categorized as normal (< 90th percentile adjusted for age, sex and height) or elevated (≥ 90th percentile adjusted for age, sex and height) reporting crude and adjusted associations (i.e. controlling for BMI, MVPA, alcohol and cigarette consumption, deprivation indexes, parental education, ethnicity and country of birth). Air quality measures (i.e. annual average concentrations of PM_{2.5} and NO₂) were

scaled to their respective interquartile ranges to describe increases in exposure.

Three sensitivity analyses were performed to assess the robustness of our findings. First, a complete case analysis was performed and compared to findings based on the imputed sample. Second, a generalized linear mixed-effects model was conducted for NO₂ and PM_{2.5} independently to adjust for school-level random clustering effects, and respective odds ratios (ORs) and confidence intervals (CIs) were compared with those for which school clustering was not controlled. Third, unadjusted and adjusted ORs were calculated from the logistic regression models using a different outcome definition, that of the 2017 guidelines from the American Academy of Pediatrics, defining elevated BP as SBP ≥ 120 mmHg in adolescents ≥ 13 years old.⁴ We compared those results with our initial results using the definition of elevated SBP as ≥ 90th percentile adjusted for age, sex and height. All statistical analyses were carried out in R version 3.5.1 (R Foundation for Statistical Computing, Vienna, AT).

Patient and public involvement statement

During the NDIT study conducted by O'Loughlin et al.,¹⁹ the study team maintained frequent personalized contact with NDIT participants (particularly after they had left high school, when data collections were less frequent) via telephone calls to verify contact information, newsletters highlighting NDIT results, emails and holiday cards.¹⁹ NDIT participants helped create the study name and logo, and designed an NDIT t-shirt that was given to all participants.¹⁹

Results

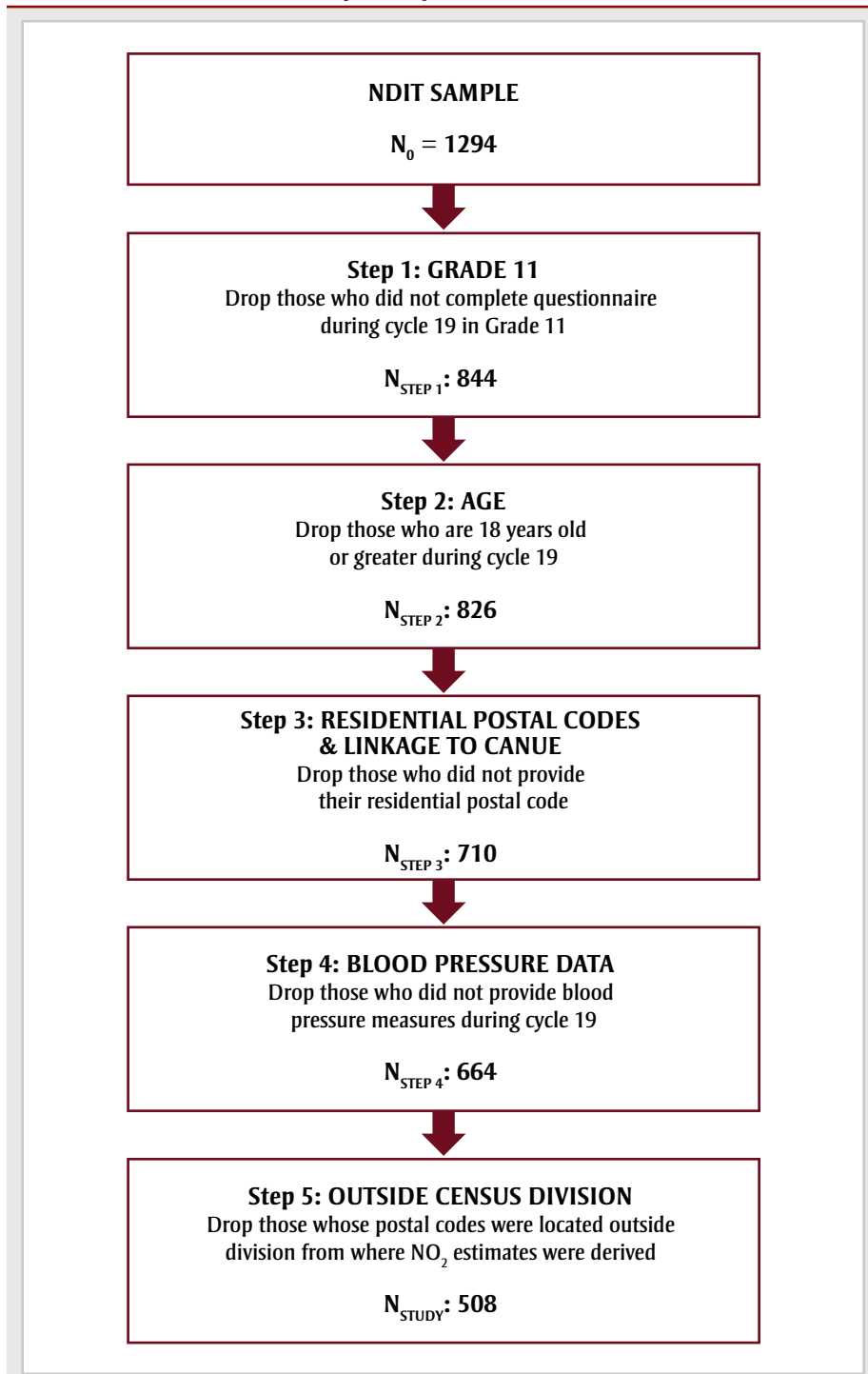
The NDIT sample comprised 1294 Grade 7 students at baseline; 844 (65%) completed the questionnaire in cycle 19, and 800 of 844 (95%) provided BP data. After excluding participants aged 18 or above, or who did not provide BP or postal code data, or who were located outside the division where NO₂ estimates were derived, the analytic sample comprised 508 adolescents (Figure 1; mean [SD] age 16.9 [0.34] years; 46% male). Most students (98%) attended an urban or suburban school. Adolescents with missing BP values were slightly less likely to have university-educated parents (data available from the authors upon request).

Seventy-seven percent of adolescents in the analytic sample were White, and 93% were born in Canada; 40% had at least one parent with a university education. According to the WHO BMI cut-offs, 81% had a normal BMI, 12% were overweight and 7% were obese. Three-quarters (76%) were nonsmokers, and half (51%) reported drinking alcohol occasionally. Adolescents in our sample were exposed to median residential levels of PM_{2.5} and NO₂ of 10.7 µg/m³ and 22.1 ppb in 2004, respectively. According to the 2020 Canadian Ambient Air Quality Standards (CAAQS), acceptable annual averages were < 8 µg/m³ and < 17 ppb for PM_{2.5} and NO₂, respectively. Thus, the median air quality exposure levels in the NDIT sample were slightly higher than the 2020 CAAQS recommendations.

We categorized neighbourhoods into less exposed (i.e. where PM_{2.5} and NO₂ levels were below the sample median) and more exposed (i.e. where PM_{2.5} and NO₂ and levels were above the sample median). Compared to adolescents living in less exposed neighbourhoods, a higher proportion of those living in more exposed areas were smokers and a lower proportion were White. Adolescents living in more exposed areas reported lower levels of physical activity (i.e. fewer bouts of MVPA per week, on average) than those living in the less exposed areas. A higher proportion of those living in more exposed areas were living in neighbourhoods with greater material and social deprivation, and were more likely to be female, compared to those living in less exposed areas (Table 1). There were no notable differences between groups in age, being Canadian-born, weight group classification, alcohol consumption in the past three months, and having at least one parent who was university-educated.

The mean (SD) SBP in our sample was 114.3 (10.8) mmHg in male adolescents and 105.4 (8.6) mmHg in female adolescents, and 16.9% of all adolescents had SBP measures ≥ 120 mmHg, which is considered elevated according to American pediatric guidelines on HTN (data not shown).⁴ Overall, 21 (4%) adolescents had elevated SBP according to our study definition (SBP ≥ 90th percentile adjusted for age, sex and height). Mean and median air quality exposures were consistently higher in the elevated SBP group compared to the normal SBP group (data available from the authors upon request).

FIGURE 1
Flow diagram illustrating the applied exclusion criteria to obtain final analytic sample of 508 adolescents



Abbreviations: CANUE, Canadian Urban Environmental Health Research Consortium; NDIT, Nicotine Dependency in Teens study.

Crude SBP measures were very similar between those living in less versus more exposed neighbourhoods (Table 2), whereas SBP percentiles adjusted for age, sex and height were slightly lower among those living in more exposed areas, compared to those in less exposed areas (Table 2).

In the logistic regression models, none of the estimates were statistically significant, indicating that the findings are inconclusive. The unadjusted OR estimates for elevated SBP for every interquartile range (IQR) increase in $PM_{2.5}$ ($2.1 \mu\text{g}/\text{m}^3$) and NO_2 (10.2 ppb) levels were 1.55 (95% CI:

0.81, 3.18) and 1.34 (0.65, 2.67), respectively. In the adjusted models, the estimated prevalence odds ratio of elevated SBP was 1.33 (0.64, 3.05) for every IQR increase in residential $PM_{2.5}$ levels. Similarly, the prevalence odds ratio of elevated SBP was 1.17 (0.47, 2.70) for every IQR increase in residential NO_2 levels (Table 3). The complete case and generalized linear mixed-effects models sensitivity analyses supported that the results were robust (data available from the authors upon request). Using the AAP definition for elevated SBP, the estimated magnitude of the effect was close to null for NO_2 , and seemingly protective for $PM_{2.5}$ (data available from the authors upon request).

Discussion

Results of this analysis suggest that long-term exposure to air pollution may be associated with an increased prevalence odds of elevated SBP in Montréal adolescents; however, we cannot make firm conclusions based on our results due to the lack of power, the possible role of chance and the lack of substantial variation in the exposures. Nevertheless, a stronger association may be present in those exposed to higher air pollution levels. Findings were consistent across complete case and generalized linear mixed-effects model sensitivity analyses, but results supported a null effect for NO_2 and a protective effect for $PM_{2.5}$ when using the 2017 AAP definition of elevated SBP. Diastolic blood pressure (DBP) was not investigated since no participants had elevated DBP as per the AAP definition (i.e. > 80 mmHg) or age-sex-height-adjusted DBP percentile ≥ 90 .

Only five studies^{15-17,30,31} have evaluated the association between long-term exposure to NO_2 and $PM_{2.5}$ and SBP in children, all of which undertook cross-sectional analyses. Two studies conducted in Europe^{15,30} reported differing associations between both air pollutants and SBP in children. In the Netherlands, BP was measured in 1400 participants aged 12 years, and annual average exposures to NO_2 and $PM_{2.5}$ were estimated by LUR models.¹⁵ The authors reported adjusted slope coefficients for NO_2 and $PM_{2.5}$ of -0.03 (95% CI: $-0.70, 0.64$) and -0.07 ($-0.97, 0.82$), respectively, showing a null effect of long-term exposure of $PM_{2.5}$ and NO_2 on SBP. A plausible reason for this observation may relate to selection bias, since the researchers excluded all children with

TABLE 1
Characteristics of sample according to classification of neighbourhood defined by NO₂ and PM_{2.5} levels below or above the sample median

	Less exposed neighbourhoods		More exposed neighbourhoods		Total sample, n = 508
	NO ₂ ≤ 10.7 ppb, n = 254	PM _{2.5} ≤ 22.1 µg/m ³ , n = 261	NO ₂ > 10.7 ppb, n = 254	PM _{2.5} > 22.1 µg/m ³ , n = 247	
Sex (%)					
Males	49	49	43	43	46
Females	51	51	57	57	54
Age, y, mean (SD)	16.9 (0.3)	16.9 (0.3)	16.9 (0.4)	16.9 (0.3)	16.9 (0.3)
White (%)	84	82	70	72	77
Born in Canada					
Yes	95	95	92	92	93
No	5	5	8	8	7
Weight group (%)					
Obese	5	6	9	7	7
Overweight	12	14	11	10	12
Normal	82	79	78	81	80
Underweight	1	1	2	2	1
MVPA, bouts/week, mean (SD)	12.5 (11.1)	12.1 (11.4)	8.5 (8.7)	8.8 (8.4)	10.5 (10.2)
Any cigarette use in past 3 months (%)					
No	83	82	69	70	76
Yes	17	18	31	30	24
Alcohol use in past 3 months (%)					
None	28	28	26	26	27
Occasional	50	49	52	53	51
Frequent	22	23	22	21	22
At least 1 parent university educated (%)	41	41	39	40	40
Material deprivation quintile^a (%)					
5 (most deprived)	2	1	17	18	9
4	5	7	17	15	11
3	11	12	14	13	13
2	19	20	19	18	19
1 (least deprived)	63	60	33	36	48
Social deprivation quintile^a (%)					
5 (most deprived)	15	16	40	40	28
4	16	15	27	28	21
3	17	18	19	18	18
2	18	18	8	8	13
1 (least deprived)	34	33	6	6	20

Data source: Nicotine Dependence in Teens study 2004/05 and Canadian Urban Environmental Health Research Consortium 2004/05.

Abbreviations: MVPA, moderate-to-vigorous physical activity; NO₂, nitrogen dioxide; PM_{2.5}, fine particulate matter; SD, standard deviation; y, years.

^a Quintiles based on 2001 Canadian census data.

asthma, and thus examined a relatively healthier sample of participants. In contrast, a German study of 2368 children aged 10 years³⁰ reported small but positive associations between each pollutant and SBP: a 0.11 mmHg (−0.45, 0.67) increase in SBP for every IQR increase in NO₂, and

a 1.01 mmHg (−0.90, 2.92) increase in SBP for every IQR increase in PM_{2.5}.

Three studies conducted in Asia^{16,17,31} reported stronger positive associations between air pollutants and SBP, possibly because their participants were exposed to

greater average concentrations of PM_{2.5} and NO₂ compared to those in our study. An analysis of the Global Burden of Diseases Study revealed that among the 10 most populous countries in the world, the United States had the lowest population-weighted amount of PM_{2.5} (annual average

TABLE 2
SBP according to classification of neighbourhood defined by NO₂ and PM_{2.5} levels below or above the sample median

	Less exposed neighbourhoods Mean (SD)		More exposed neighbourhoods Mean (SD)	
	NO ₂ ≤ 10.7 ppb	PM _{2.5} ≤ 22.1 µg/m ³	NO ₂ > 10.7 ppb	PM _{2.5} > 22.1 µg/m ³
SBP, mmHg				
Males	114.7 (11.7)	114.2 (11.0)	114.0 (10.2)	114.4 (10.7)
Females	105.2 (8.1)	105.3 (8.2)	105.5 (8.9)	105.4 (9.0)
Total sample	110.0 (11.1)	109.2 (10.6)	109.1 (10.3)	109.6 (10.7)
SBP, age-sex-height-adjusted percentile				
	39.60 (27.23)	39.00 (26.72)	37.16 (27.58)	37.98 (26.93)

Abbreviations: NO₂, nitrogen dioxide; PM_{2.5}, fine particulate matter; SBP, systolic blood pressure; SD, standard deviation.

of approximately 10 µg/m³) over the last 25 years, while Bangladesh, India, Pakistan and China were the top four countries with the greatest amounts of PM_{2.5}, ranging from annual averages of 60 µg/m³ to 90 µg/m³.³² Sughis et al.¹⁷ evaluated the association between prehypertension, defined as SBP ≥ 120–139 mmHg or DBP ≥ 80–89 mmHg, in 166 children aged 8 to 12 years (mean age 9.9 years) from two schools, each situated in an area with high (located next to a highway) compared to low (located next to a park in a new residential settlement) air pollution in Lahore, Pakistan. The adjusted OR for BP > 120 mmHg was 2.56 (95% CI: 0.96, 6.78) for children attending school in the more polluted area compared to those in the less polluted area.

Two studies in China used SBP percentiles, in addition to SBP, in their outcome assessment. Dong et al.³¹ evaluated the association between SBP as well as the prevalence of HTN, defined as SBP and DBP ≥ 95th percentile, and satellite estimates of NO₂ in 9354 children aged 5 to 17 (mean age: 10.9 years, SD: 2.5). Their results showed that for every IQR increase

in NO₂, SBP increased by 1.15 mmHg (95% CI: 0.84, 1.46). Additionally, the adjusted prevalence odds of being hypertensive in their sex-stratified models increased by 28% in males (OR: 1.28; 95% CI: 1.14, 1.43) and 39% in females (1.39; 1.23, 1.56). Using data from the same study as well as the same outcome definitions, Zhang et al.¹⁶ evaluated the association with PM_{2.5} in 43 785 children aged between 7 and 18 (mean age: 11.3 years, SD: 3.1). After adjusting for covariates, every 10 µg/m³ increase in PM_{2.5} was associated with a 1.46 mmHg (0.05, 2.88) increase in SBP, and 31% higher odds (1.31; 0.86, 1.98) of being hypertensive.

Overall, although our estimates were imprecise, the general trend we observed suggested increased SBP was associated with increased air pollution, and was mostly consistent with the existing literature evaluating the association between long-term exposure to NO₂ and PM_{2.5} and SBP in children.

Strengths and limitations

Strengths of this study include the examination of the association between long-term

exposure to air pollution and BP in a subset of North American adolescents. Trends in pollution levels for the study sample were very stable during the previous (2003) and same year (2004/05) that SBP was measured, increasing confidence in the validity of the pollution levels (i.e. average annual exposure) and reducing the likelihood of exposure misclassification. In addition, SBP was assessed by trained technicians using standardized procedures, which reduces the possibility of outcome misclassification. Lastly, covariate data pertaining to sociodemographic information and behaviours were included in adjusted models, with little missing information.

Limitations include the observational study design, which limits causal inferences. Duration of residence at the reported postal code and frequency of moving were unknown. Without exposure history, it is not possible to examine long-term exposure to air pollution and SBP. Selection bias is a possibility, as only 39.3% (508 of 1294) of the NDIT baseline sample and 60.2% (508 of 844) of adolescents who responded in cycle 19 were included in the analysis. However, it is unlikely to have substantially changed our findings, as NDIT participants were representative of the general Quebec adolescent population, with the exception that those included in our sample may have been of higher socioeconomic status, since a slightly greater proportion had university-educated parents.

Exposure misclassification may also be a concern. Grade 11 students spend much of their day at school. Thus, air pollution levels assessed at their home address may not accurately reflect their “true” daytime exposure, unless school and residences share the same postal code. Further, the PM_{2.5} estimates used in this study had a spatial resolution of one kilometre, based on participants’ home. If major variations existed within this buffer zone, actual exposure may differ from assigned exposure. However, any misclassification was likely nondifferential (i.e. PM_{2.5} estimates did not depend on SBP measures), which would bias results towards the null.

Additionally, we did not have data on traffic noise and participants’ second-hand smoke exposure, which are hypothesized to influence BP and air pollution and could have confounded our results. Two

TABLE 3
Estimated prevalence of elevated SBP for every interquartile range increase in PM_{2.5} and NO₂ for pollutant-specific unadjusted and adjusted logistic regression models

	Unadjusted OR (95% CI)	Adjusted OR ^a (95% CI)
PM _{2.5} (IQR: 2.1 µg/m ³)	1.55 (0.81, 3.18)	1.33 (0.64, 3.05)
NO ₂ (IQR: 10.2 ppb)	1.34 (0.65, 2.67)	1.17 (0.47, 2.70)

Abbreviations: BMI, body mass index; CI, confidence interval; IQR, interquartile range; NO₂, nitrogen dioxide; OR, odds ratio; PM_{2.5}, fine particulate matter; SBP, systolic blood pressure.

Note: Elevated SBP is defined as ≥ 90th age-sex-height-adjusted percentile.

^a Adjusted for BMI percentile, moderate-to-vigorous physical activity, material and social deprivation, alcohol and cigarette consumption in past 3 months, country of birth, ethnicity, level of parental education.

studies, however, reported that associations between SBP and long-term air pollution exposure were not confounded by traffic-noise exposure.^{15,30} As well, while the etiological associations likely stand, the data used in this study were collected 15 to 20 years ago, which may limit current practical applications of our findings. Lastly, our analyses were based on a study originally designed for other research questions; as a result, power was limited to observe a small effect.

Conclusion

This study provides evidence suggestive of a possible positive association between NO₂ and PM_{2.5} and SBP in adolescents; however, results were inconclusive due to the imprecision of our estimates. Further investigation is needed to provide a stronger basis for causal inference, including more frequent or even continuous monitoring of BP outcomes and air pollution exposures over time, and associated analyses. If accumulating evidence establishes air pollution as a “modifiable” environmental risk factor for elevated BP and HTN, benefits to public health could be substantial in Canada and around the world.

Acknowledgements

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Conflicts of interest

The authors declare that they have no actual or potential conflicts of interest.

Authors’ contributions and statement

EM, JOL and TAB contributed to the study conceptualization. Data curation was performed under the supervision of JOL as part of the NDIT study. Formal analysis was performed by EM with supervision from CL and TAB. MZ gave scientific input on study outcomes, and PJV gave scientific input on study exposures. EM wrote the original draft, and CL, JOL, PJV, MZ, GBE and TAB reviewed and edited the manuscript. All authors read and approved the final manuscript.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

References

1. Theodore RF, Broadbent J, Nagin D, et al. Childhood to early-midlife systolic blood pressure trajectories: early-life predictors, effect modifiers, and adult cardiovascular outcomes. *Hypertension*. 2015;66(6):1108-15. <https://doi.org/10.1161/HYPERTENSION.AHA.115.05831>
2. National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. *Pediatrics*. 2004;114(2 Suppl 4th report):555-76.
3. Rosner B, Cook N, Portman R, Daniels S, Falkner B. Blood pressure differences by ethnic group among United States children and adolescents. *Hypertension*. 2009;54(3):502-8. <https://doi.org/10.1161/HYPERTENSION.AHA.109.134049>
4. Flynn JT, Kaelber DC, Baker-Smith CM, et al. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. *Pediatrics*. 2017;140(3):e20171904. <https://doi.org/10.1542/peds.2017-1904> Errata in: *Pediatrics*. 2018;42(3):e20181739. <https://doi.org/10.1542/peds.2018-1739>
5. Chen X, Wang Y, Mi J. Tracking of blood pressure from childhood to adulthood: a systematic review and meta-analysis. *FASEB J*. 2007;21(6):A1363. <https://doi.org/10.1096/fasebj.21.6.A1363-b>
6. Guzman-Limon M, Samuels J. Pediatric hypertension: diagnosis, evaluation, and treatment. *Pediatr Clin North Am*. 2019;66(1):45-57. <https://doi.org/10.1016/j.pcl.2018.09.001>
7. Hansen ML, Gunn PW, Kaelber DC. Underdiagnosis of hypertension in children and adolescents. *JAMA*. 2007;298(8):874-9. <https://doi.org/10.1001/jama.298.8.874>
8. Giorgini P, Di Giosia P, Grassi D, Rubenfire M, Brook RD, Ferri C. Air pollution exposure and blood pressure: an updated review of the literature. *Curr Pharm Des*. 2016;22(1):28-51. <https://doi.org/10.2174/1381612822666151109111712>
9. Brook RD, Rajagopalan S. Particulate matter, air pollution, and blood pressure. *J Am Soc Hypertens*. 2009;3(5):332-50. <https://doi.org/10.1016/j.jash.2009.08.005>
10. Chen H, Burnett RT, Kwong JC, et al. Spatial association between ambient fine particulate matter and incident hypertension. *Circulation*. 2014;129(5):562-9. <https://doi.org/10.1161/CIRCULATIONAHA.113.003532>
11. Huang M, Chen J, Yang Y, Yuan H, Huang Z, Lu Y. Effects of ambient air pollution on blood pressure among children and adolescents: a systematic review and meta-analysis. *J Am Heart Assoc*. 2021;10(10):e017734. <https://doi.org/10.1161/JAHA.120.017734>
12. Perez CM, Hazari MS, Farraj AK. Role of autonomic reflex arcs in cardiovascular responses to air pollution exposure. *Cardiovasc Toxicol*. 2015;15(1):69-78. <https://doi.org/10.1007/s12012-014-9272-0>
13. Brook RD, Brook JR, Urch B, Vincent R, Rajagopalan S, Silverman F. Inhalation of fine particulate air pollution and ozone causes acute arterial vasoconstriction in healthy adults. *Circulation*. 2002;105(13):1534-6. <https://doi.org/10.1161/01.cir.0000013838.94747.64>

14. Han X, Naeher LP. A review of traffic-related air pollution exposure assessment studies in the developing world. *Environ Int.* 2006;32(1):106-20. <https://doi.org/10.1016/j.envint.2005.05.020>
15. Bilenko N, van Rossem L, Brunekreef B, et al. Traffic-related air pollution and noise and children's blood pressure: results from the PIAMA birth cohort study. *Eur J Prev Cardiol.* 2015;22(1):4-12. <https://doi.org/10.1177/2047487313505821>
16. Zhang Z, Dong B, Li S, et al. Exposure to ambient particulate matter air pollution, blood pressure and hypertension in children and adolescents: a national cross-sectional study in China. *Environ Int.* 2019;128:103-8. <https://doi.org/10.1016/j.envint.2019.04.036>
17. Sughis M, Nawrot TS, Ihsan-ul-Haque S, Amjad A, Nemery B. Blood pressure and particulate air pollution in schoolchildren of Lahore, Pakistan. *BMC Public Health.* 2012;12:378. <https://doi.org/10.1186/1471-2458-12-378>
18. Wang X, Zou Z, Dong B, et al. Association of school residential PM_{2.5} with childhood high blood pressure: results from an observational study in 6 cities in China. *Int J Environ Res Public Health.* 2019; 16(14):2515. <https://doi.org/10.3390/ijerph16142515>
19. O'Loughlin J, Dugas EN, Brunet J, et al. Cohort profile: the Nicotine Dependence in Teens (NDIT) study. *Int J Epidemiol.* 2015;44(5):1537-46. <https://doi.org/10.1093/ije/dyu135>
20. Paradis G, Lambert M, O'Loughlin J, et al. The Québec Child and Adolescent Health and Social Survey: design and methods of a cardiovascular risk factor survey for youth. *Can J Cardiol.* 2003;19(5):523-31.
21. Gauderman WJ, Avol E, Lurmann F, et al. Childhood asthma and exposure to traffic and nitrogen dioxide. *Epidemiology.* 2005;16(6):737-43. <https://doi.org/10.1097/01.ede.0000181308.51440.75>
22. Crouse DL, Peters PA, Hystad P, et al. Ambient PM_{2.5}, O₃, and NO₂ exposures and associations with mortality over 16 years of follow-up in the Canadian Census Health and Environment Cohort (CanCHEC). *Environ Health Perspect.* 2015;123(11):1180-6. <https://doi.org/10.1289/ehp.1409276>
23. Park MK, Menard SM. Accuracy of blood pressure measurement by the Dinamap monitor in infants and children. *Pediatrics.* 1987;79(6):907-14. Erratum in: *Pediatrics* 1988 May; 81(5):683.
24. Dionne JM, Harris KC, Benoit G, et al. Hypertension Canada's 2017 guidelines for the diagnosis, assessment, prevention, and treatment of pediatric hypertension. *Can J Cardiol.* 2017;33(5):577-85. <https://doi.org/10.1016/j.cjca.2017.03.007>
25. Rosner B, Cook N, Portman R, Daniels S, Falkner B. Determination of blood pressure percentiles in normal-weight children: some methodological issues. *Am J Epidemiol.* 2008;167(6):653-66. <https://doi.org/10.1093/aje/kwm348>
26. van Donkelaar A, Martin RV, Spurr RJ, Burnett RT. High-resolution satellite-derived PM_{2.5} from optimal estimation and geographically weighted regression over North America. *Environ Sci Technol.* 2015;49(17):10482-91. <https://doi.org/10.1021/acs.est.5b02076>
27. Hystad P, Setton E, Cervantes A, et al. Creating national air pollution models for population exposure assessment in Canada. *Environ Health Perspect.* 2011;119(8):1123-9. <https://doi.org/10.1289/ehp.1002976>
28. Pampalon R, Hamel D, Gamache P, Raymond G. A deprivation index for health planning in Canada. *J Chronic Dis Can.* 2009;29(4):178-91.
29. Batista GE, Monard MC. A study of *k*-nearest neighbour as an imputation method. Paper presented at the Second International Conference on Hybrid Intelligent Systems (HIS 2002); 2002 Dec 1-4; Santiago, Chile. In: Abraham A, Ruiz-del-Solar J, Köppen M, editors. *Soft computing systems: design, management and applications.* [Frontiers in artificial intelligence and applications series, vol. 87.] : Amsterdam (NL): IOS Press; 2002. p. 251-260.
30. Liu C, Fuertes E, Tiesler CM, et al. The associations between traffic-related air pollution and noise with blood pressure in children: results from the GINIplus and LISAPLUS studies. *Int J Hyg Environ Health.* 2014; 217(4-5):499-505. <https://doi.org/10.1016/j.ijheh.2013.09.008>
31. Dong G-H, Qian ZM, Trevathan E, et al. Air pollution associated hypertension and increased blood pressure may be reduced by breastfeeding in Chinese children: the Seven North-eastern Cities Chinese Children's Study. *Int J Cardiol.* 2014;176(3):956-61. <https://doi.org/10.1016/j.ijcard.2014.08.099>
32. Cohen AJ, Brauer M, Burnett R, et al. Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015. *Lancet.* 2017; 389(10082):1907-18. [https://doi.org/10.1016/S0140-6736\(17\)30505-6](https://doi.org/10.1016/S0140-6736(17)30505-6)

Letter to the Editor

What we need is a political-economic public health

Lindsay McLaren, PhD

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To the Editor:

I fully agree with Choi et al.¹ that ongoing, interdisciplinary collaboration is needed to address complex health problems and improve health for all. However, “clinical public health” as described in this commentary is not going to achieve this.

First, it is well established that the root causes of poor health and health inequities lie in political-economic arrangements anchored in neoliberal capitalism. Due to its profit maximization imperative, these arrangements erode social and ecological determinants of health, and this is experienced in a highly inequitable and unjust manner.² Examples include the financialization of housing; subsidies to polluting industries; and polarization of income and wealth, which erodes broad support for a robust public sector. It is untenable to consider that we might address “wicked problems” and “syndemics” without considering this broader political-economic context, including who is benefiting from the status quo.

Moreover, while curative and preventive (“upstream”) activities may be “complementary,” they are certainly not equal. Power and politics combine to perpetuate longstanding and pernicious problems of lifestyle drift and medicalization, which reduce complex, structural determinants to individual problems, allegedly amenable to technical, individual-level solutions.³ These processes consistently obscure root causes.

To attempt to tackle these issues, a much broader version of interdisciplinary collaboration is required, which includes critical social science scholarship that engages deeply with root causes of health

problems including extractive and exploitative relationships. The challenges to those sorts of collaborations are very significant, but so are the benefits of working to redress them.⁴

All of this is theoretically consistent with a broad version of public health, long defined as the art and science of preventing disease and promoting health through organized efforts of society. Although Choi et al.¹ don’t define public health in their commentary, it is clear that they adopt a narrow version of public health as an arm of the health care/medical system focussed primarily on service delivery and surveillance. Unfortunately, it is this narrow version of public health, which has been building for decades,⁵ that we have seen during the COVID-19 pandemic, to the detriment of population health and health equity.⁶

What we need is a broad vision for public health⁷ that embraces, rather than brackets, the power and politics that shape all aspects of health and our efforts to improve it.

References

1. Choi BCK, King AS, Graham K, et al. Clinical public health: harnessing the best of both worlds in sickness and in health [commentary]. *Health Promot Chronic Dis Prev Can.* 2022;42(10):440-4. <https://doi.org/10.24095/hpcdp.42.10.03>
2. Bump JB, Baum F, Sakornsin M, Yates R, Hofman K. Political economy of COVID-19: extractive, regressive, competitive. *BMJ.* 2021;362:n73. <https://doi.org/10.1136/bmj.n73>
3. Baum F, Fisher M. Why behavioural health promotion endures despite its failure to reduce health inequities. *Social Health Illn.* 2014;36(2):213-25. <https://doi.org/10.1111/1467-9566.12112>
4. Mykhalovskiy E, Frohlich KL, Poland B, Di Ruggiero E, Rock JM, Comer L. Critical social science with public health: agonism, critique and engagement. *Crit Public Health.* 2019;29(5):522-33. <https://doi.org/10.1080/09581596.2018.1474174>
5. Yong E. How public health took part in its own downfall. *The Atlantic*, 2021 Oct 23, Health. Available from: <https://www.theatlantic.com/health/archive/2021/10/how-public-health-took-part-its-own-downfall/620457/>
6. Hancock T, Kershaw P, McLaren L, MacDonald M, Turner S, Jackson SF. There is much more to public health than COVID-19. *Healthy Debate*, 2020 Jun 15. Available from: <https://healthydebate.ca/2020/06/topic/more-to-public-health-than-covid/>
7. McLaren L, Hennessy T. A broader vision of public health. *The Monitor*, 2020 Dec 31. Available from: <https://policyalternatives.ca/publications/monitor/broader-vision-public-health>

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Letter to the Editor

Re: Clinical public health: harnessing the best of both worlds in sickness and in health

Chandrakant P. Shah, MD, FRCPC, SM (Hyg), OOnt, DrSc(Hon)

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Dear Editor,

I read “Clinical public health: harnessing the best of both worlds in sickness and health” by Choi et al.¹ with great interest and commend and congratulate all the authors for their diligence in developing the foundational work on the discipline of clinical public health by being members of the multidisciplinary group consisting of clinicians and public health professionals. I thought your readers would benefit from knowing some historical facts to appreciate the seminal work done by these authors.

The specialty of public health was recognized by the Royal College of Physicians and Surgeons of Canada (RCPSC) in the 1940s, and a fellowship (FRCPC) was granted in public health. Other than in the province of British Columbia, the fellowship was not required to work in public health. Only British Columbia and Alberta had residency programs, and the majority of the field public health physicians received either their diploma or master’s

degree in public health from the School of Hygiene at the University of Toronto or from the United States of America or the United Kingdom. The specialty of public health by the RCPSC became moribund, and in the early 1970s the RCPSC taskforce was established to revive the program. The taskforce recommended that a four-year residency program be developed with broad guidelines and specific streams. One of the streams defined in this program was Clinical Prevention, although with scant details.

I was the inaugural director of this newly created residency program at the University of Toronto in 1976. Over a twenty-five year period, others and I attempted to define this field, without much success. After my retirement in 2001, I again attempted and received a grant from the Public Health Agency of Canada to do a literature search and define it. I failed again! In the last decade, when Dr. Ross Upshur renewed the concept and established a division of clinical public health at the Dalla Lana School of

Public Health, I was excited. In retrospect, I failed because I did not bring clinicians and public health professionals together to define the common elements and synergy needed. Also, the impact of climate change and COVID-19 on the health and well-being of individuals and the population brought to our attention that to solve the health crisis, medicine and public health need to work together. I am elated to see this development in my twilight years! My compliments to all of the authors for a job well done. I hope to see this needed subspecialty flourish to improve the health and well-being of Canadians.

Reference

1. Choi BCK, King AS, Graham K et al. Clinical public health: harnessing the best of both worlds in sickness and in health [commentary]. *Health Promot Chronic Dis Prev Can.* 2022;42(10): 440-4. <https://doi.org/10.24095/hpcdp.42.10.03>

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Letter to the Editor

Authors' response to Letters to the Editor re: Clinical public health: harnessing the best of both worlds in sickness and in health

**Bernard C. K. Choi, PhD (1,2,3); Arlene S. King, MD, MHSc (1); Kathryn Graham, PhD (1,4);
Rose Bilotta, MD, MHSc (1); Peter Selby, MBBS, MHSc (1,4,5,6); Bart J. Harvey, MD, PhD (1);
Neeru Gupta, MD, PhD (1,7,8); Pierrette Buklis, MHSc, RD (1); Donna L. Reynolds, MD, MSc (1,5)**

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We are pleased that our paper on clinical public health¹ received support from Dr. Shah,² who also provides important historical aspects of clinical public health. Dr. Shah was the inaugural director of a newly created residency program (Community Medicine, now known as Public Health and Preventive Medicine) at the University of Toronto in 1976. Although he claims to have failed to “bring clinicians and public health professionals together to define the common elements and synergy needed,”² we believe he did not fail, because his efforts ignited sparks among his students (including several co-authors of this paper¹). Building on his important legacy, subsequent generations of clinicians and public health professionals have made strides towards effective collaboration of clinical medicine and public health.

Dr. McLaren rejects the formation of clinical public health because it is insufficient “to address complex health problems and improve health for all,” and instead proposes political-economic public health that includes wider intersectoral collaboration.³ We recognize that clinical public health is insufficient to accomplish all health goals, yet humbly assert that the collaboration envisioned through clinical public health will facilitate feasible, principled progress. Sometimes we need to

start incrementally, as progressing too ambitiously could result in the best becoming the enemy of the better. Clinical public health is a new starting point that we hope will eventually help leverage broader collaboration across professional and advocacy sectors. Also, while clinical public health cannot address all health problems, we would argue that political-economic public health, per se, will equally not solve all the problems resulting from the shortcomings in current political and economic systems—although it could be an important step along the way.

We concur with Dr. McLaren that “curative and preventive (‘upstream’) activities” are not equal in power.³ We note that public health is often the “poor cousin of clinical medicine”¹ and suggest that adoption of a clinical public health collaborative model is one way to achieve a healthy power balance.

Dr. McLaren suggests that our paper “adopt[s] a narrow version of public health as an arm of the health care/medical system focussed primarily on service delivery and surveillance.”³ On the contrary, we view public health in a broad sense. Our paper¹ is the second in our clinical public health paper series. Our

first paper, “Defining clinical public health,”⁴ surveyed clinicians, researchers and public health professionals. It was apparent that the concept of clinical public health subsumes the broadest understanding of public health, including socially based health issues caused by “shared social and commercial determinants.”^{4,E75}

Our first paper⁴ led to two letters to the editor: one that rejected⁵ and one that supported⁶ the idea of clinical public health. This second paper¹ has also led to two letters: one supporting² and the other questioning³ our idea. We hope that these papers and the resulting letters in response will lead to further discussion and debate on the feasibility and future development of clinical public health, and perhaps a broader understanding of and action on the political and economic determinants of health.

References

1. Choi BCK, King AS, Graham K, et al. Clinical public health: harnessing the best of both worlds in sickness and in health [commentary]. *Health Promot Chronic Dis Prev Can.* 2022;42(10):440-4. <https://doi.org/10.24095/hpcdp.42.10.03>

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2. Shah CP. Re: Clinical public health: harnessing the best of both worlds in sickness and in health [letter]. *Health Promot Chronic Dis Prev Can.* 2023; 43(4):200. <https://doi.org/10.24095/hpcdp.43.4.06>
 3. McLaren L. What we need is a political-economic public health [letter]. *Health Promot Chronic Dis Prev Can.* 2023;43(4):199. <https://doi.org/10.24095/hpcdp.43.4.05>
 4. Choi BCK, Pakes B, Bilotta R, et al. Defining clinical public health. *Clin Invest Med.* 2021;44(2):E71-E76. <https://doi.org/10.25011/cim.v44i2.36479>
 5. Young K. Can public health be “clinical”? [letter]. *Clin Invest Med.* 2021; 44(2):E77. <https://doi.org/10.25011/cim.v44i2.36449>
 6. Ramsay T. On “Defining clinical public health” [letter]. *Clin Invest Med.* 2021; 44(2):E77. <https://doi.org/10.25011/cim.v44i2.36449>

Addendum and Publisher's Note

Recommendations for Canada's National Action Plan to End Gender-Based Violence: perspectives from leaders, service providers and survivors in Canada's largest city during the COVID-19 pandemic

This Addendum and Publisher's Note is intended to provide further information and context deemed pertinent for readers in relation to the [following article](#).

Yakubovich AR, Steele B, Moses C, Tremblay E, Arcenal M, O'Campo P, Mason R, Du Mont J, Huijbregts M, Hough L, Sim A, Shastri P. Recommendations for Canada's National Action Plan to End Gender-Based Violence: perspectives from leaders, service providers and survivors in Canada's largest city during the COVID-19 pandemic. *Health Promot Chronic Dis Prev Can.* 2023;43(4). <https://doi.org/10.24095/hpcdp.43.4.01>

1. The article refers to Canada's "proposed" National Action Plan to End Gender-Based Violence (GBV NAP). The editors feel it is worth noting that federal, provincial and territorial government endorsement of the NAP was [announced](#) on November 9, 2022,¹ after this manuscript was accepted for publication.

In addition, the following statement within the article's introduction has been slightly modified from the January 18, 2023, online-first version:

"To date in Canada, only a 'strategy to prevent and address gender-based violence' has been implemented," is replaced by "At the time of writing this manuscript, in Canada, only a 'strategy to prevent and address gender-based violence' has been implemented."

2. The introduction and methods sections of the article present a rounded figure of CAD 600 million over five years in relation to 2022 federal government investments to advance prevention of gender-based violence under the NAP. To be factual, Budget 2021 initially proposed an investment of CAD 601.3 million over five years to advance the GBV NAP.² This investment was affirmed in Budget 2022 with an additional CAD 539.3 million commitment over five years to enable provinces and territories to implement the NAP and to supplement and enhance services for the prevention of gender-based violence and support for survivors.³

References

1. Women and Gender Equality Canada. National action plan to end gender-based violence. Ottawa (ON): Women and Gender Equality Canada; [modified 2022 Nov 9]. Available from: <https://femmes-egalite-genres.canada.ca/en/ministers-responsible-status-women/national-action-plan-end-gender-based-violence/first-national-action-plan-end-gender-based-violence.html>
2. Department of Finance Canada. A recovery plan for jobs, growth, and resilience: Budget 2021. 9.2 Keeping Canadians safe and improving access to justice. Ottawa (ON): Government of Canada; 2021. Available from: <https://www.budget.canada.ca/2021/report-rapport/p3-en.html#chap9>
3. Department of Finance Canada. A plan to grow our economy and make life more affordable: Budget 2022. 8.2 Keeping Canadian safe. Ottawa (ON): Government of Canada; 2022. Available from: <https://www.budget.canada.ca/2022/report-rapport/chap8-en.html#2022-2>

World Non-Communicable Diseases Congress 2023

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The third World Non-Communicable Diseases Congress (WNCD 2023) will cover major NCDs (for example, cardiovascular, cancer, diabetes, respiratory, and mental illness) and their risk factors through key lenses including:

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The World Health Organization, Canadian Institutes of Health Research (CIHR), the U.S. National Institutes of Health (NIH), the World Bank, UNICEF and governments of Canada and India will be presenting sessions and have representatives at Congress.

On behalf of the Public Health Agency of Canada, we invite you to attend to represent Canadian science on the world stage. For those who are interested, additional information is available on the WNCD 2023 website.

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Call for Papers: Social Prescribing in Canada

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Guest Editors: Sandra Allison (Island Health Authority), Kiffer Card (Simon Fraser University), Kate Mulligan (University of Toronto)

HPCDP Journal Editors: Robert Geneau and Margaret de Groh (Public Health Agency of Canada)

Social prescribing (SP) is a practical tool for addressing the social determinants of health through supported referrals to community services. This globally spreading intervention aims to promote health and prevent chronic disease by supporting individual and community self-determination and connecting participants to nonclinical supports in their communities, such as food and income support, parks and walking groups, arts and cultural activities or friendly visiting.¹

Global evidence demonstrates that SP can support individual and population health, build the evidence base on the impacts of social interventions for health promotion and chronic disease prevention and integrate health and social care at the community level.² However, while SP practices continue to scale and spread across Canada, and knowledge mobilization is underway through the new Canadian Institute for Social Prescribing,³ there is relatively little published literature on this novel intervention in Canadian contexts and by Canadian researchers, practitioners and participants.

The objective of this special issue is to identify and share the most current research and practice on SP by and for residents of Canada, particularly those facing inequities in access to health and its social and structural determinants. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice* therefore seeks relevant qualitative and quantitative research articles, as well as commentaries, that present new findings, synthesize existing evidence or imagine new ways forward on (for example)

- applications of SP, including those for specific populations or specific types of social interventions;
- policies and systems changes relevant to SP uptake;
- expertise and experiences of SP actors, including participants (patients), health care workers, community organizations and caregivers;
- training, workforce development, collaboration and knowledge mobilization for SP;
- technology, data tracking, evaluation and evidence building in SP; and
- understanding of SP through theoretical frameworks and systems trends.

International submissions will be considered if they include Canadian data, results (e.g. as part of multi-country studies or global comparisons) and/or evidence-based discussion of implications for community or population health in Canada.

Consult the Journal's website for information on article types and detailed [submission guidelines for authors](#). Kindly refer to this call for papers in your cover letter.

All manuscripts should be submitted using the Journal's [ScholarOne Manuscripts](#) online system. Pre-submission inquiries and questions about suitability or scope can be directed to HPCDP.Journal-Revue.PSPMC@phac-aspc.gc.ca.

Submission deadline: July 31, 2023.

References

1. Bhatti S, Rayner J, Pinto AD, Mulligan K, Cole DC. Using self-determination theory to understand the social prescribing process: a qualitative study. *BJGP Open*. 2021;5(2):BJGPO.2020.0153. <https://doi.org/10.3399/bjgpo.2020.0153>
2. Morse DF, Sandhu S, Mulligan K, et al. Global developments in social prescribing. *BMJ Global Health*. 2022;7:e008524. <https://doi.org/10.1136/bmjgh-2022-008524>
3. Canadian Institute for Social Prescribing. What matters to you [Internet]. Toronto (ON): CISP; 2022 [cited 2022 Nov 16]. Available from: <http://www.socialprescribing.ca/>

Other PHAC publications

Researchers from the Public Health Agency of Canada also contribute to work published in other journals and books. Look for the following articles published in 2022 and 2023:

Baillot A, Chaput J-P, **Prince SA**, [...] **Lang JJ**. Health associations with meeting the new Canadian 24-Hour Movement Guidelines recommendations according to body mass index classes in Canadian adults. *Health Rep.* 2022;33(11):3-15. <https://www.doi.org/10.25318/82-003-x202201100001-eng>

Blair D-L, **Shields M**, **Tonmyr L**. Concerns about household violence during the COVID-19 pandemic. *Int J Environ Res Public Health.* 2022;19(22):14633. <https://doi.org/10.3390/ijerph192214633>

Borderon M, **Ludwig A**, **Brazeau S**. Vulnerable populations. In: Brazeau S, Ogden NH, editors. *Earth observation, public health and One Health: activities, challenges and opportunities*. Oxfordshire (UK): CABI; 2022. p. 66-77.

Brazeau S, Vignolles C, Krishnamurthy RS, [...] **Kotchi SO**, [...] **Ogden NH**, **Ludwig A**, et al. Needs, challenges, and opportunities: a review by experts. In: Brazeau S, Ogden NH, editors. *Earth observation, public health and One Health: activities, challenges and opportunities*. Oxfordshire (UK): CABI; 2022. p. 93-103.

Campeau A, Tanaka M, McTavish JR, [...] **Hovdestad WE**, [...] **Tonmyr L**. Asking youth and adults about child maltreatment: a review of government surveys. *BMJ Open.* 2022;12(11):e063905. <https://doi.org/10.1136/bmjopen-2022-063905>

Davis Z, **de Groh M**, Rainham DG. The Canadian Environmental Quality Index (Can-EQI): development and calculation of an index to assess spatial variation of environmental quality in Canada's 30 largest cities. *Environ Int.* 2022;170:107633. <https://doi.org/10.1016/j.envint.2022.107633>

Fahim C, Wiebe N, Nisenbaum R, [...] **Holmes NM**, et al. Changes in mammography screening in Ontario and Alberta following national guideline dissemination: an interrupted time series analysis. *F1000 Res.* 2022;10:1044. <https://doi.org/10.12688/f1000research.55004.2>

Halsall T, Mahmoud K, Iyer SN, **Orpana H**, et al. Implications of time and space factors related with youth substance use prevention: a conceptual review and case study of the Icelandic Prevention Model being implemented in the context of the COVID-19 pandemic. *Int J Qual Stud Health Well-being.* 2023;18(1):2149097. <https://doi.org/10.1080/17482631.2022.2149097>

Halsall T, Mahmoud K, **Pouliot A**, et al. Building engagement to support adoption of community-based substance use prevention initiatives. *BMC Public Health.* 2022;22(1):2213. <https://doi.org/10.1186/s12889-022-14496-9>

Khattar J, Griffith LE, Jones A, **De Rubeis V**, **de Groh M**, **Jiang Y**, et al. Symptoms of depression and anxiety, and unmet healthcare needs in adults during the COVID-19 pandemic: a cross-sectional study from the Canadian Longitudinal Study on Aging. *BMC Public Health.* 2022;22(1):2242. <https://doi.org/10.1186/s12889-022-14633-4>

Lange S, Roerecke M, **Orpana H**, et al. Alcohol use and the gender-specific risk of suicidal behavior: a systematic review and meta-analysis protocol. *Syst Rev.* 2022;11(1):279. <https://doi.org/10.1186/s13643-022-02159-0>

Luke S, Hobbs AJ, Smith M, [...] **Nelson C**. Cannabis use in pregnancy and maternal and infant outcomes: a Canadian cross-jurisdictional population-based cohort study. *PLoS ONE.* 2022;17(11):e0276824. <https://doi.org/10.1371/journal.pone.0276824>

MacNeil A, Birk S, Villeneuve PJ, **Jiang Y**, **de Groh M**, et al. Incident and recurrent depression among adults aged 50 years and older during the COVID-19 pandemic: a longitudinal analysis of the Canadian Longitudinal Study on Aging. *Int J Environ Res Public Health.* 2022;19(22):15032. <https://doi.org/10.3390/ijerph192215032>

Pagnotta VF, King N, Donnelly PD, **Thompson W**, et al. Access to medical care and its association with physical injury in adolescents: a cross-national analysis. *Inj Prev.* 2022. <https://doi.org/10.1136/ip-2022-044701>

Plouffe R, **Grywacheski V**, **Luo W**, **Nelson C**, **Orpana H**. Neonatal abstinence syndrome hospitalizations in Canada: a descriptive study. *Can J Public Health.* 2022. <https://doi.org/10.17269/s41997-022-00726-5>

Rodrigue L, Manaugh K, El-Geneidy A, [...] **Wasfi R**, [...] **Butler G**. Factors influencing subjective walkability: results from built environment audit data. *J Transp Land Use*. 2022;15(1):709-27. <https://doi.org/10.5198/jtlu.2022.2234>

Saxena S, Liu L, Pollock N, McFaul SR. Self-harm emergency department visits in Canada during the COVID-19 pandemic: evidence from a sentinel surveillance system. *Inj Epidemiol*. 2023;10(1):1. <https://doi.org/10.1186/s40621-022-00411-8>

Warner E, Nadouri D, **Orpana H**, et al. A scoping review of the definition of walkability and its relationship with depression and anxiety symptoms. *Can J Community Ment Health*. 2022;41(2):46-67. <https://doi.org/10.7870/cjcmh-2022-014>

