A portrait of the early and differential mental health impacts of the COVID-19 pandemic in Canada: Findings from the first wave of a nationally representative cross-sectional survey

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ABSTRACT

Evidence on the population-level mental health impacts of COVID-19 are beginning to amass; however, to date, there are significant gaps in our understandings of *whose* mental health is most impacted, how the pandemic is contributing to widening mental health inequities, and the coping strategies being used to sustain mental health.

The first wave of a repeated cross-sectional monitoring survey was conducted between May 14–29, 2020 to assess the mental health impacts of the pandemic and to identify the disproportionate impacts on populations or groups identified as experiencing increased risks due to structural vulnerability and pre-existing health and social inequities. Respondents included a nationally representative probability sample ($n = 3000$) of Canadian adults 18 years and older.

Overall, Canadian populations are experiencing a deterioration in mental health and coping due to the pandemic. Those who experience health, social, and/or structural vulnerabilities due to pre-existing mental health conditions, disability, income, ethnicity, sexuality, and/or gender are more likely to endorse mental health deterioration, challenging emotions, and difficulties coping.

This monitoring study highlights the differential mental health impacts of the pandemic for those who experience health, social, and structural inequities. These data are critical to informing responsive, equity-oriented public health, and policy responses in real-time to protect and promote the mental health of those most at risk during the pandemic and beyond.

1. Background

Novel coronavirus disease (COVID-19), an acute respiratory infection caused by the coronavirus SARS-nCoV-2, was first identified in late 2019. In March 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic (World Health Organization, 2020), while research and theoretical investigations have been documenting the far-reaching morbidity and mortality consequences. Data are also beginning to identify disproportionate impacts and growing health and social disparities among specific populations and groups, primarily related to the social determinants of health (Baqui et al., 2020; Haynes et al., 2020; Laurencin and McClinton, 2020; Poteat et al., 2020; Power et al., 2020; Zhang and Schwartz, 2020). The social determinants of health, which comprise the everyday conditions in which we live, include gender, race

and ethnicity, sexual orientation, disability status, and resources such as employment and income, food and housing, and social supports (Canadian Mental Health Association, 2020). Access to the social determinants of health is often constrained by structural vulnerabilities, which are risks imposed by systems of power and oppression that create and maintain sociocultural, economic, and political inequities (Farmer, 2001).

For example, racialized and Indigenous communities (Laurencin and McClinton, 2020), (Poteat et al., 2020) and people living in poverty (The World Bank, 2020) are populations whose physical health outcomes have been disproportionately impacted by the COVID-19 virus. Additionally, while empirical investigations on the disproportionate impacts of the virus due to other vulnerabilities are in progress, compelling evidence from the broader literature suggests that COVID-19 will have a greater adverse effect on those experiencing other health, social, and structural inequities related to gender, sexual orientation, and mental health and disability status, for example (Casey, 2019; Douglas et al., 2020). These vulnerabilities often intersect, contributing to compounding inequities and risk (Douglas et al., 2020).

In addition to physical health repercussions, evidence on the population-level mental health impacts of the pandemic is beginning to amass. Available data indicate significant increases in the prevalence of adverse mental health outcomes, including feelings of low mood and worry through to clinically significant experiences of depression, anxiety, and suicidal thoughts and behaviours (Angus Reid Institute, 2020). Indeed, the mental health consequences of COVID-19 are being characterized as the "4th wave" of the pandemic and are projected to be responsible for the largest, most enduring health footprint (see Fig. 1) (Tseng, 2020), with the number of people impacted expected to rise dramatically in the short- and long-term (Haynes et al., 2020; Douglas et al., 2020). People with pre-existing mental health conditions are particularly at-risk (Campion et al., 2020).

Not unlike the physical health consequences, growth in the prevalence of mental health challenges amid the pandemic illustrates how profoundly population-level mental health is shaped by the social determinants of health. The marked increase in mental health challenges has been attributed to weeks of physical distancing and isolation measures, increasing rates of unemployment, economic uncertainty, loss of childcare, disproportionate and gendered caregiving, housing instability, and food insecurity (Van Lancker and Parolin, 2020; Canadian Human Rights Commission, 2020).

In Canada, several polls have examined the mental health impacts of the pandemic, demonstrating growing mental health concerns across the nation (Angus Reid Institute, 2020; Morneau Shepell, 2020; Findlay and Arim, 2020). For example, in April 2020, 50% of Canadians reported that their mental health had worsened during the pandemic, with over 40% noting that they were worried and/or anxious (Angus Reid Institute, 2020). In May 2020, Statistics Canada noted a 14% decline since 2018 in the proportion of the population identifying their mental health as "very good" or "excellent" (Findlay and Arim, 2020).

These findings on the mental health consequences of the pandemic are mirrored in other country contexts. For example, in a large-scale nationwide survey conducted by Qiu and colleagues (2020) in late January and early February 2020, the research team measured the prevalence and severity of psychological distress among a convenience sample of people living in China. While the findings were focused on describing mental health impacts among the general population, there were indications that certain sub-populations were disproportionately impacted, including women, migrant workers, people aged 18–30 as well as those who were over 60 years of age (Qiu et al., 2020). In another cross-sectional survey, Mazza and colleagues (2020) used a convenience sample to provide a rapid epidemiological estimate of the mental health impacts of the pandemic during mid-March in Italy. Findings suggest that quarantine measures had a profound impact on mental health and that adverse mental health impacts were more likely among certain groups or demographics including women, people experiencing unemployment and those with existing medical conditions (Mazza et al., 2020). Fitzpatrick and colleagues (2020) also conducted a nationally representative survey, but with a focus on fear and mental health consequences (i.e., depression and anxiety) due to the pandemic in the United States (US). Similar to findings from China and Italy, certain populations were more likely to experience mental health consequences, including women and those experiencing unemployment as well as families with children and people who identified as belonging to a visible minority group. However, the primary focus of this study was on fear responses to the pandemic across geographic regions of the country, with more limited focus on mental health outcomes (Fitzpatrick et al., 2020). In the United Kingdom (UK), Pierce and colleagues conducted a secondary analysis of data collected through the UK Household Longitudinal Study to examine changes in mental health among the general population prior to and during lockdown in April 2020. Aligned with other national surveys, the findings indicate that UK residents
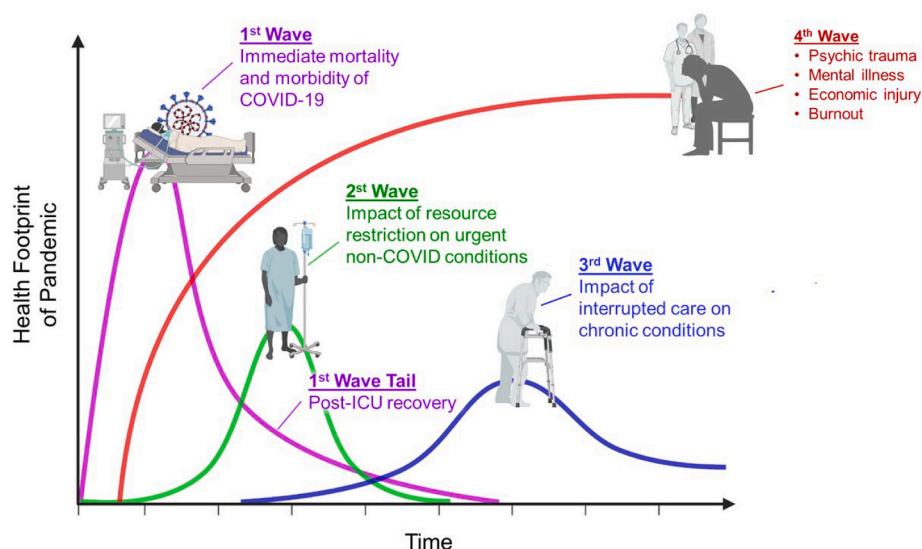

Fig. 1. The four waves of COVID-19. (Source: @VectorSting (Tseng, 2020))

experienced a deterioration in mental health since the onset of the pandemic and that adverse mental health impacts are concentrated among women, young people and families with young children (Pierce et al., 2020a). In addition to these national surveys, Xiong and colleagues (2020) conducted a systematic review examining the mental health impacts of the pandemic among people living in China, Spain, Italy, Iran, the US, Turkey, Nepal and Denmark (Xiong et al., 2020). The researchers conclude that the pandemic has resulted in high rates of adverse mental health symptoms among the general populations living in these countries, with women, people under 40 years of age, those with comorbid physical or mental health conditions and who experience unemployment more likely to be impacted. Additionally, those who were students and who had frequent exposure to social or news media about the pandemic were also more likely to experience adverse mental health outcomes.

However, as described, Canadian and other nationwide polls conducted to date have primarily utilized non-probability samples, which have been critiqued as problematic and prone to bias (Pierce et al., 2020b). Further, the analyses conducted have focused predominantly on the mental health impacts experienced among the general population. This has left significant gaps in our understandings of *whose* mental health is most impacted, how the pandemic is contributing to widening mental health inequities, and coping strategies sustaining mental health.

The present monitoring study seeks to contribute to addressing current omissions in the scientific literature by expanding and further highlighting differential impacts of the pandemic for different subgroups, to provide data critical to informing equity-oriented public health and policy responses in real-time to protect and promote the mental health of those most at risk. While the focus is largely descriptive in nature, this is crucial for ensuring a baseline dataset to monitor the population mental health impacts of the pandemic over time.

2. Methods

2.1. Survey development and approach

The development of this repeated cross-sectional monitoring survey, *"Assessing the Impacts of COVID-19 on Mental Health"*, represents a unique collaboration between academic researchers from the University of British Columbia (UBC) and the Canadian Mental Health Association (CMHA), a national mental health advocacy organization. It benefits from an international research partnership with the Mental Health Foundation, a national UK mental health organization. Our interdisciplinary and intersectoral team represents a critical element of our research process, providing direct linkages to policy decision makers to influence rapid, data-driven policy and programming responses. Further, our global partnership facilitates the potential for cross-nation comparisons, identified as a key mental health priority within the COVID-19 pandemic (Holmes et al., 2020).

2.2. Outcomes

Survey items were initially informed by a UK longitudinal survey commissioned by the Mental Health Foundation in March 2020. Original item development was guided by research evidence on mental health impacts of past pandemics. The survey was refined in consultation with people with lived experience of mental health conditions involving a citizen's jury participatory methodology process (Kousoulis et al., 2020a). Items were modified, and questions added to reflect the Canadian context, with the aim to examine indicators of mental health, stress, and coping in the previous two weeks among the Canadian population 18 years and older during the COVID-19 pandemic. Emphasis was placed on facilitating identification of the disproportionate impacts of the pandemic on populations or groups identified as experiencing increased risks due to structural vulnerability and pre-existing health and social inequities. This was achieved by including items on race/

ethnicity, socioeconomic status, gender, sexual orientation, and mental health and disability status (see Additional File 1).

2.3. Data collection and analyses

This investigation focuses on our first wave of data collection, with at least two additional strategic waves planned in the coming months. Online surveys were distributed by national polling vendor, Maru/Matchbox, which manages an online 'restricted access' panel (Maru Voice Canada panel) of approximately 125,000 members. This panel is available to trusted research partners as an approach to promoting sample integrity and data quality. Panel participants were recruited through a variety of mechanisms to ensure inclusion of difficult to reach populations (e.g., older adults, racialized populations).

From May 14–29,2020, Maru/Matchbox deployed the online survey to a random selection of panel members from across all Canadian provinces and territories stratified by Canadian Census-informed socioeconomic characteristics (age, gender household income, region). Adjustments were made for response propensity to generate a nationally representative sample by these characteristics. Surveys were available in Canada's two official languages, English and French. This data collection period corresponds with the time when many Canadian provinces/territories initiated their first phases of "re-opening", following approximately two-months of physical distancing orders and closures. Analyses focused on examining six constructs related to mental health during the COVID-19 pandemic: self-reported mental health, emotional responses, sources of stress, coping, substance use, and experiences of suicidality and self-harm. The maximum margin of error for proportions derived from a sample consisting of $n = 3000$ participants is $+/- 1 \cdot 79\%$ at a 95% level of confidence. Differences in proportions within groups were tested with Chi-squared tests. To ensure representativeness of our sample, results were also statistically weighted according to current Census data for age, gender, region, and income in the adult population of Canada.

2.4. Ethics

Ethical approval for this study was provided by the Behavioural Research Ethics Board at UBC (H20–01273). All participants provided online consent prior to beginning the survey and received a small honorarium through Maru/Matchbox to compensate for their time.

3. Results

Qualifying members of the Maru Voice Canada panel were invited to participate in the survey ($n = 3558$) to reach a total of 3000 respondents, yielding an invitation-to-response rate of 84%. Results were statistically weighted using current Canadian Census data to ensure a sample reflective of the adult Canadian population by age, gender, region, and income. The average age of respondents was 49·1 years (SD = 16·2) and 51·1% were female, with more detailed socio-demographic characteristics presented in Table 1. In presenting the following results, we first provide the proportion of respondents who endorsed a particular experience, followed by the 95% confidence interval, which appears in brackets.

3.1. Self-reported mental health amid COVID-19

Overall, 38·2% (95% CI 36·5–40·0) of respondents indicated a deterioration in mental health since the onset of the COVID-19 pandemic. Statistically significant differences were identified within subgroups of the population. Specifically, people with pre-existing mental health conditions were the group most likely to report a deterioration in mental health (59·1%, 95% CI 55·0–63·2). People with a disability and those with an annual household income <$25,000 were also more likely to report worse mental health [47·5% (95% CI

Table 1
Socio-demographic characteristics of the sample.

		Total respondents $N = 3000$	%
Gender[a]	Man	1467	48·9
	Woman	1533	51·1
Age	18–34	534	17·8
	35–54	1157	38·6
	55+	1309	43·6
Household income	<$25 K	234	7·8
	$25 K- < $50 K	504	16·8
	$50 K- < $100 K	992	33·1
	$100 K+	1270	42·3
Education	Elementary/grade school	6	0·2
	Some high school	67	2·2
	High school graduate	358	11·9
	Some college / technical school	252	8·4
	Completed college / technical school	620	20·7
	Some university	267	8·9
	University undergraduate degree	813	27·1
	Some post-graduate school	141	4·7
	Post-graduate degree	476	15·9
Ethnicity	Indigenous origins (for example, First Nations, Inuit, Métis)	87	2·9
	South Asian origins (for example, Indian, Punjabi, Pakistani)	70	2·3
	East Asian origins (for example, Chinese, Japanese, Korean)	177	5·9
	Southeast Asian origins (for example, Filipino, Thai, Vietnamese)	47	1·6
	Latin American origins (for example, Brazilian, Cuban, Bolivian)	25	0·8
	European origins (for example, British, German, Russian)	2117	70·6
	Middle Eastern origins (for example, Iranian, Iraqi, Afghan)	27	0·9
	African origins (for example, Nigerian, Ghanaian, Zimbabwean)	38	1·3
Province	BC/Territories	440	14·7
	Alberta	333	11·1
	Ontario	1140	38
	Quebec	658	21·9
	Manitoba/Saskatchewan	194	6·5
	Atlantic provinces	235	7·8
Area of residence	Urban	2516	83·9
	Rural	484	16·1
Employment	Working full time (30 or more hours per week)	1225	40·8
	Working part time (fewer than 30 hours per week)	286	9·5
	Retired	882	29·4
	Full time student (e.g. school, college, university, job training)	50	1·7
	Part time student (e.g. school, college, university, job training)	16	0·5
	Unemployed (due to COVID-19)	284	9·5
	Unemployed (prior to COVID-19)	103	3·4
Prior mental health condition	Yes	546	18·2
Disability	Yes	316	10·5
Parent	Parent / guardian (to a child under 18)	618	20·6
Essential service worker	Yes	817	27·2

[a] The polling vendor that distributed this survey, Maru/matchbox, provides demographic data for each panel member, which is collected in advance of survey participation. Though this binary representation of gender was used in this analysis, we recognize that binary gender identities do not accurately capture everyone's self-identified gender; however, our sample sizes for other gender identities were not large enough to conduct meaningful analyses.

41·7–53·3) and 43·5% (95% CI 37·3–49.8), respectively]. Additionally, the impacts of the pandemic on mental health were gendered, with women more likely to report a deterioration of their mental health than men [44·4% (95% CI 41·9–47·0) vs 32·5% (95% CI 30·1–35·0)] (Table 2).

3.2. Emotional responses to COVID-19

Linked to this deterioration in mental health, respondents identified several challenging emotional experiences as common. Overall, respondents were most likely to report experiencing anxiety/worry (46·0%, 95% CI 44·2–47·8), boredom (39·4%, 95% CI 37·7–41·2), stress (37·5%, 95% CI 35·7–39·3), loneliness/isolation (30·5%, 95% CI 28·9–32·2), and sadness (26·8%, 95% CI 25·3–28·5). Experiences of depression were also common (23·1%, 95% CI 21·6–24·7). However, indicators of resilience were likewise observed, with some respondents feeling calm (24·8%, 95% CI 23·3–26·4), hopeful (24·4%, 95% CI 22·8–25·9), empathetic (23·0%, 95% CI 21·5–24·6), and content

(12·3%, 95% CI 11·1–13·6).

Like self-reported mental health, there were notable differences in emotional responses among populations experiencing health and social inequities. For example, people with a pre-existing mental health condition were again more likely to endorse challenging emotions including anxiety (62·5%, 95% CI 58·4–66·5), stress (57·8%, 95% CI 53·6–61·9), depression (46·1%, 95% CI 42·0–50·3), loneliness (45·3%, 95% CI 41·1–49·4), and sadness (40·5%, 95% CI 36·4–44·7) compared to those without a pre-existing mental health condition. Challenging emotions were also highly prevalent among those with a low household income and those with a disability (Table 3).

3.3. Sources of stress

Sources of stress centered largely on concerns related to the virus itself (e.g., getting ill, loved ones dying). However, financial concerns (37·4%, 95% CI 35·7–39·2) and job loss (22·6%, 95% CI 21·1–24·1) were also among the most endorsed stressors. Those in the lowest

Table 2
Changes in self-reported mental health since the onset of the COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25- <$50 K	$50 K- <$100 K	$100 K+	p value	VM	NVM	IND	p value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Better mental health	261 9%	119 8%	141 9%	<0.001	33 14%	224 8%	<0.001	27 10%	49 10%	85 9%	100 8%	0.012	67 15%	146 7%	13 14%	<0.001	25 8%	235 9%	0.002	56 10%	202 8%	<0.001
Worse mental health	1146 38%	485 32%	660 44%		104 45%	1035 38%		110 43%	157 32%	374 38%	504 40%		164 36%	800 39%	37 41%		142 47%	988 37%		336 59%	795 33%	
About the same	1587 53%	891 59%	697 46%		95 41%	1486 54%		116 46%	288 58%	528 53%	656 52%		219 49%	1104 54%	41 46%		132 44%	1445 54%		176 31%	1402 58%	

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.
Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

income category were more likely to report concerns regarding finances (52·6%, 95% CI 46·2–58·9) compared to those with higher income. Food insecurity was also concerning, with 17·5% (95% CI 16·2–18·9) of respondents identifying worry about having enough food to meet their household's basic needs. Stress related to experiencing physical or emotional domestic violence was more frequently reported by visible minority groups (17·1%, 95% CI 13·7–20·9) and Indigenous (13·3%, 95% CI 7·1–22·1) compared to non-visible minority groups (6·6%, 95% CI 5·6–7·8). Overall, groups defined by people with a pre-existing mental health condition and/or a disability reported particularly prevalent experiences with negative stressors due to COVID-19 (Table 4).

3.4. Coping

Approximately 14·3% (95% CI 13·1–15·6) of respondents indicated they were "not coping very well" or "not well at all". Important differences were identified within population subgroups. Again, those with a pre-existing mental health condition (28·2%, 95% CI 24·5–32·1), household income <$25,000 (24·9%, 95% CI 19·7–30·7), and those with a disability (24·4%, 95% CI 19·7–29·7) were more likely than other groups to identify coping challenges. There were also differences by ethnicity in how people felt they were coping, with Indigenous peoples (23·3%, 95% CI 15·1–33·4) and those who identify as a visible minority (19·7%, 95% CI 16·2–23·7) more likely to report coping challenges than their non-visible minority counterparts (12·5%, 95% CI 11·1–14·1).

The most commonly employed coping strategy was exercise, with 58·6% (95% CI 56·8–60·4) of the overall sample endorsing this strategy. This was followed by connecting with family/friends (56·1%, 95% CI 54·3–57·9) and maintaining a healthy lifestyle (43·3%, 95% CI 41·5–45·1). Aligned with the social determinant underpinnings of mental health, accessing Federal Government benefits and supports was an important coping strategy for some respondents in the overall sample (10·7%, 95% CI 9·6–11·9), as was having a supportive employer (16·7%, 95% CI 15·4–18·1). Much less common, even for those with a pre-existing mental health condition, was the use of in-person or virtual mental health care/resources (Table 5).

3.5. Substance use

Within the overall sample, 19·5% (95% CI 18·1–20·1) indicated that their use of alcohol had increased because of the pandemic. The group most likely to report increased alcohol use was Indigenous peoples (24·4%, 95% CI 16·0–34·6). In terms of cannabis and prescription medication use, those with a pre-existing mental health condition endorsed the greatest levels of increased use at 13·2% (95% CI 10·5–16·3) and 8·1% (95% CI 6·0–10·7) respectively, versus 5·8% (95% CI 4·9–6·8) and 2·5% (95% CI 1·9–3·2) among those without a mental health condition. Reports of increased use of tobacco and other psychoactive substances were less common (Table 6).

3.6. Experiences of suicidality and self-harm

Within the overall sample, 6·4% (95% CI 5·5–7·3) of participants reported experiencing suicidal thoughts/feelings as a result of the pandemic and 1·9% (95% CI 1·5–2·5) reported intentionally harming themselves. Those with a pre-existing mental health condition were more likely to report these experiences compared to those without a mental health condition [18·1% (95% CI 15·1–21·6) and 4·1% (95% CI 2·6–6·0), respectively]. Indigenous peoples (15·6%, 95% CI 8·8–24·7), people with a disability (14·7%, 95% CI 10·9–19·3), and those with a household income <$25,000 (13·8%, 95% CI 9·8–18·7) were also more likely to report experiencing suicidal thoughts/feelings. People who identified as LGBTQ+ were more likely than those who did not identify as LGBTQ+ to report both suicidal thoughts (14·2%, 95% CI 10·0–19·4) and self-harm (6·9%, 95% CI 4·0–11·0) versus 5·8% (95% CI 4·9–6·7) and 1·5% (95% CI 1·1–2·1), respectively (Table 7).

Table 3
Emotional responses to the COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25K	$25K-<$50K	$50K-<$100K	$100K+	p value	VM	NVM	IND	p-value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Challenging emotions																						
Anxious or worried	1379	568	811	<0·001	118	1252	0·131	120	225	447	587	0·868	224	952	40	0·389	155	1208	0·029	355	1005	<0·001
	46%	38%	54%		51%	46%		47%	45%	45%	47%		50%	46%	44%		52%	45%		63%	42%	
Bored	1183	556	628	0·006	113	1063	0·004	94	215	379	495	0·237	156	860	42	0·008	128	1044	0·210	272	901	<0·001
	39%	37%	42%		49%	39%		37%	43%	38%	39%		35%	42%	47%		43%	39%		48%	37%	
Stressed	1124	447	677	<0·001	108	1013	0·005	106	188	384	445	0·146	157	791	41	0·112	140	970	<0·001	328	781	<0·001
	37%	30%	45%		46%	37%		42%	38%	39%	35%		35%	39%	46%		47%	36%		58%	33%	
Lonely or isolated	916	386	530	<0·001	87	824	0·021	98	153	318	346	0·002	121	647	42	0·001	113	795	0·004	257	649	<0·001
	31%	26%	35%		37%	30%		39%	31%	32%	27%		27%	32%	47%		38%	30%		45%	27%	
Sad	805	307	498	<0·001	71	730	0·192	76	139	267	323	0·461	104	587	18	0·016	97	700	0·021	230	566	<0·001
	27%	20%	33%		30%	27%		30%	28%	27%	26%		23%	29%	20%		32%	26%		41%	24%	
Depressed	694	292	403	<0·001	83	609	<0·001	87	120	239	249	<0·001	111	479	28	0·221	109	579	<0·001	262	419	<0·001
	23%	19%	27%		36%	22%		34%	24%	24%	20%		25%	23%	31%		36%	22%		46%	17%	
Angry	571	249	322	0·001	53	514	0·139	46	94	190	241	0·983	46	433	19	<0·001	79	482	<0·001	179	386	<0·001
	19%	17%	21%		23%	19%		18%	19%	19%	19%		10%	21%	21%		26%	18%		32%	16%	
Afraid	506	198	309	<0·001	47	455	0·145	52	85	181	188	0·066	72	325	13	0·934	76	421	<0·001	151	349	<0·001
	17%	13%	21%		20%	17%		20%	17%	18%	15%		16%	16%	14%		25%	16%		27%	15%	
Hopeless	379	151	228	<0·001	36	342	0·183	48	68	123	141	0·008	65	242	15	0·142	55	321	0·002	133	239	<0·001
	13%	10%	15%		15%	12%		19%	14%	12%	11%		14%	12%	17%		18%	12%		24%	10%	
Panicked	247	81	166	<0·001	39	206	<0·001	32	60	75	80	<0·001	38	166	11	0·379	48	192	<0·001	93	150	<0·001
	8%	5%	11%		17%	7%		12%	12%	8%	6%		8%	8%	12%		16%	7%		16%	6%	
Positive emotions																						
Calm	745	396	348	0·053	49	691	0·179	59	120	248	318	0·903	95	537	22	0·075	60	681	0·040	109	628	0·001
	25%	26%	23%		21%	25%		23%	24%	25%	25%		21%	26%	24%		20%	25%		19%	26%	
Hopeful	731	356	375	0·290	50	677	0·302	58	126	227	320	0·497	98	536	18	0·076	76	649	0·666	134	591	0·635
	24%	24%	25%		21%	25%		23%	25%	23%	25%		22%	26%	20%		25%	24%		24%	25%	
Empathetic	690	283	406	<0·001	54	634	0·935	47	98	222	323	0·012	89	521	21	0·038	78	605	0·179	170	517	<0·001
	23%	19%	27%		23%	23%		18%	20%	22%	26%		20%	25%	23%		26%	23%		30%	22%	
Comfortable	504	233	271	0·064	28	471	0·044	26	84	151	242	0·002	53	377	16	0·003	47	455	0·567	82	419	0·090
	17%	16%	18%		12%	17%		10%	17%	15%	19%		12%	18%	18%		16%	17%		14%	17%	
Secure	386	190	195	0·786	34	350	0·414	22	61	119	183	0·050	37	280	12	0·007	39	345	0·949	71	313	0·740
	13%	13%	13%		15%	13%		9%	12%	12%	15%		8%	14%	13%		13%	13%		12%	13%	
Content	370	168	203	0·067	28	339	1·000	27	54	130	160	0·493	46	272	14	0·160	30	338	0·193	69	299	0·862
	12%	11%	14%		12%	12%		11%	11%	13%	13%		10%	13%	15%		10%	13%		12%	12%	

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.

Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 4
Sources of stress amid COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25 K-<$50 K	$50 K-<$100 K	$100 K+	p value	VM	NVM	IND	p-value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Finance and employment related stressors																						
Financial concerns (debt and inability to pay bills)	1122	531	591	0.009	107	1009	0.004	133	213	386	390	<0.001	210	724	37	<0.001	133	977	0.001	287	820	<0.001
	37%	35%	39%		46%	37%		53%	43%	39%	31%		47%	35%	41%		44%	37%		51%	34%	
Unable to access benefit /not being eligible	543	274	268	0.634	57	484	0.007	79	115	182	167	<0.001	117	321	21	<0.001	88	448	<0.001	154	381	<0.001
	18%	18%	18%		24%	18%		31%	23%	18%	13%		26%	16%	23%		29%	17%		27%	16%	
Loss of job	678	315	363	0.015	63	614	0.082	67	113	235	263	<0.001	154	418	16	<0.001	62	608	0.295	155	512	<0.001
	23%	21%	24%		27%	22%		26%	23%	24%	21%		34%	20%	18%		21%	23%		27%	21%	
Health related stressors																						
Becoming ill with the virus	1400	641	758	<0.001	119	1274	0.210	126	225	461	588	0.099	195	969	44	<0.001	170	1219	<0.001	318	1068	<0.001
	47%	43%	51%		51%	46%		50%	45%	47%	47%		43%	47%	49%		57%	46%		56%	44%	
Having no-one to care for me, as a result of becoming ill with the virus	500	226	273	0.014	54	443	0.010	81	103	170	146	<0.001	97	296	16	<0.001	96	401	<0.001	136	360	<0.001
	17%	15%	18%		23%	16%		32%	21%	17%	12%		22%	14%	18%		32%	15%		24%	15%	
Passing COVID-19 on to someone else	1502	643	859	<0.001	136	1359	0.023	134	250	494	623	0.027	207	1051	46	<0.001	155	1334	0.277	347	1137	<0.001
	50%	43%	57%		58%	49%		53%	50%	50%	49%		46%	51%	51%		52%	50%		61%	47%	
Being vulnerable because of an existing medical condition, age	1037	488	549	0.015	94	938	0.023	108	179	319	431	<0.001	113	746	40	<0.001	196	833	<0.001	282	745	<0.001
	35%	33%	37%		41%	34%		43%	36%	32%	34%		25%	36%	44%		65%	31%		50%	31%	
Fear of getting severely sick or dying	1025	445	580	<0.001	87	933	0.419	102	188	331	404	0.001	169	677	33	<0.001	139	878	<0.001	251	763	<0.001
	34%	30%	39%		37%	34%		40%	38%	33%	32%		38%	33%	37%		47%	33%		44%	32%	
Not being able to care for friends and family as a result of becoming ill	714	325	388	0.003	62	650	0.183	70	124	223	297	0.004	123	455	18	0.024	86	625	0.002	164	544	<0.001
	24%	22%	26%		27%	24%		27%	25%	23%	24%		27%	22%	20%		29%	23%		29%	23%	
Family/ friends related stressors																						
Not being able to care for friends and family due to physical distancing	1094	469	625	<0.001	100	990	0.027	103	175	334	482	0.005	165	732	27	0.010	116	967	0.058	256	827	<0.001
	36%	31%	42%		43%	36%		41%	35%	34%	38%		37%	36%	30%		39%	36%		45%	34%	
Being separated from friends and family	1771	777	993	<0.001	151	1613	0.098	151	293	551	775	0.026	208	1270	55	<0.001	192	1564	0.011	382	1373	<0.001
	59%	52%	66%		65%	59%		60%	59%	56%	62%		46%	62%	60%		64%	59%		67%	57%	
Worrying about the mental health of my child(ren) affected by the pandemic	748	342	406	<0.001	36	710	0.807	50	112	224	362	0.129	105	510	25	0.259	82	660	0.008	149	586	<0.001
	25%	23%	27%		15%	26%		20%	23%	23%	29%		23%	25%	28%		27%	25%		26%	24%	
Fear of a family member/loved one getting severely sick or dying	1699	765	934	<0.001	150	1540	0.015	138	273	556	732	0.531	242	1185	50	0.003	185	1501	0.011	374	1310	<0.001
	57%	51%	62%		65%	56%		54%	55%	56%	58%		54%	58%	56%		62%	56%		66%	55%	
Stressors related to partner																						
Experiencing relationship challenges with my partner	571	273	298	0.140	64	507	<0.001	46	89	190	246	0.004	93	376	26	<0.001	54	515	0.118	147	418	<0.001
	19%	18%	20%		28%	18%		18%	18%	19%	20%		21%	18%	29%		18%	19%		26%	17%	
Being safe from physical or emotional domestic violence	276	151	126	0.155	27	246	0.082	38	56	90	94	<0.001	77	135	12	<0.001	33	236	0.024	60	216	0.066
	9%	10%	8%		11%	9%		15%	11%	9%	7%		17%	7%	13%		11%	9%		11%	9%	
Other stressors																						
Being able to cope with uncertainty	1517	645	872	<0.001	136	1373	0.016	149	252	490	627	0.002	231	1032	43	0.003	175	1327	<0.001	371	1126	<0.001
	51%	43%	58%		59%	50%		59%	51%	50%	50%		51%	50%	48%		59%	50%		65%	47%	
Having enough food to meet my household's basic needs	525	242	283	0.035	48	473	0.183	93	121	153	158	<0.001	116	294	23	<0.001	83	437	<0.001	137	383	<0.001
	18%	16%	19%		21%	17%		37%	24%	15%	13%		26%	14%	26%		28%	16%		24%	16%	

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Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 5

Coping strategies amid COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25 K-< $50 K	$50 K-< $100 K	$100 K+	p value	VM	NVM	IND	p-value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Overall coping																						
Very/fairly well	2402	1210	1192	0·016	174	2215	0·008	165	389	788	1059	<0·001	323	1704	63	<0·001	212	2174	<0·001	385	1997	<0·001
	80%	81%	79%		75%	81%		65%	78%	80%	84%		72%	83%	70%		71%	81%		68%	83%	
Not very well/not well at all	430	189	241		48	379		63	71	145	150		89	257	21		73	349		160	263	
	14%	13%	16%		21%	14%		25%	14%	15%	12%		20%	13%	23%		24%	13%		28%	11%	
Self-care activities																						
Going for a walk/exercise outside	1758	812	946	<0·001	129	1621	0·332	121	244	555	838	<0·001	184	1310	48	<0·001	136	1607	<0·001	321	1418	0·282
	59%	54%	63%		55%	59%		48%	49%	56%	67%		41%	64%	53%		46%	60%		56%	59%	
Maintaining a healthy lifestyle	1298	594	704	<0·001	88	1204	0·085	69	188	408	633	<0·001	157	953	34	<0·001	94	1196	<0·001	216	1069	0·006
	43%	40%	47%		38%	44%		27%	38%	41%	50%		35%	47%	30%		31%	45%		38%	44%	
Doing a hobby	1127	497	631	<0·001	101	1022	0·057	94	187	373	473	0·999	130	827	36	<0·001	120	1002	0·373	246	872	0·002
	38%	33%	42%		44%	37%		37%	38%	38%	38%		29%	40%	40%		40%	37%		43%	36%	
Spending time with my pet(s)	825	305	520	<0·001	96	728	<0·001	66	129	252	378	0·075	61	633	30	<0·001	93	723	0·137	220	597	<0·001
	27%	20%	35%		41%	26%		26%	26%	25%	30%		14%	31%	33%		31%	27%		39%	25%	
Connecting virtually with family or friends	1684	713	971	<0·001	128	1549	0·731	119	261	548	757	<0·001	200	1228	43	<0·001	161	1512	0·365	318	1354	0·910
	56%	48%	65%		55%	56%		47%	52%	55%	60%		44%	60%	48%		54%	57%		56%	56%	
Using external support																						
Having a supportive employer	500	226	273	0·008	51	447	0·035	20	60	171	249	<0·001	56	373	12	0·008	33	465	0·005	112	386	0·036
	17%	15%	18%		22%	16%		8%	12%	17%	20%		12%	18%	13%		11%	17%		20%	16%	
Accessing federal government benefits and supports	321	150	171	0·238	32	287	0·121	43	68	105	105	<0·001	77	201	12	<0·001	36	283	0·442	85	231	<0·001
	11%	10%	11%		14%	10%		17%	14%	11%	8%		17%	10%	13%		12%	11%		15%	10%	
Connecting with a mental health worker or counsellor virtually	123	38	85	<0·001	21	102	<0·001	26	20	39	38	<0·001	19	90	4	0·986	33	85	<0·001	79	43	<0·001
	4%	3%	6%		9%	4%		10%	4%	4%	3%		4%	4%	4%		11%	3%		14%	2%	
Accessing provincial government supports	95	48	47	1·000	15	79	0·006	12	23	31	28	0·026	20	60	4	0·211	10	84	0·851	30	63	0·001
	3%	3%	3%		7%	3%		5%	5%	3%	2%		4%	3%	4%		3%	3%		5%	3%	
Accessing virtual mental health resources	67	26	41	0·051	9	57	0·097	7	13	22	24	0·729	24	34	2	<0·001	11	55	0·071	30	37	<0·001
	2%	2%	3%		4%	2%		3%	3%	2%	2%		5%	2%	2%		4%	2%		5%	2%	
Contacting a support group	51	23	28	0·406	6	45	0·285	9	6	17	20	0·155	16	28	1	0·005	7	42	0·333	14	36	0·106
	2%	2%	2%		3%	2%		3%	1%	2%	2%		4%	1%	1%		2%	2%		3%	2%	

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.

Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 6
Substance use amid COVID-19 pandemic.

	Total sample (n = 3000)	Gender Male (n = 1492)	Gender Female (n = 1486)	p value	LGBT2Q+ Yes (n = 232)	LGBT2Q+ No (n = 2750)	p value	Income <$25 K (n = 253)	$25-<$50 K (n = 497)	$50 K-<$100 K (n = 990)	$100 K+ (n = 1261)	p value	Ethnicity VM (n = 451)	NVM (n = 2050)	IND (n = 90)	p value	Disability Yes (n = 299)	No (n = 2672)	p value	Pre-existing mental health condition Yes (n = 568)	No (n = 2404)	p value
Drinking alcohol	584 19%	291 19%	293 20%	0.963	53 23%	531 19%	0.197	16 6%	65 13%	206 21%	297 24%	<0.001	73 16%	414 20%	22 24%	<0.001	37 12%	545 20%	0.001	123 22%	455 19%	0.140
Use of tobacco products	146 5%	83 6%	63 4%	0.107	19 8%	127 5%	0.025	13 5%	27 5%	60 6%	46 4%	0.059	28 6%	93 5%	6 7%	<0.001	21 7%	125 5%	0.078	34 6%	113 5%	0.204
Use of cannabis products	217 7%	114 8%	104 7%	0.527	42 18%	175 6%	<0.001	24 9%	34 7%	83 8%	77 6%	0.100	43 10%	151 7%	4 4%	0.002	25 8%	187 7%	0.385	75 13%	139 6%	<0.001
Use of prescribed medication	107 4%	48 3%	59 4%	0.325	15 7%	92 3%	0.025	12 5%	19 4%	36 4%	40 3%	0.639	19 4%	59 3%	9 10%	<0.001	19 6%	88 3%	0.007	46 8%	59 2%	<0.001
Use of other psychoactive (cocaine, heroin)	42 1%	31 2%	12 1%	0.005	11 5%	31 1%	<0.001	5 2%	7 1%	19 2%	10 1%	0.079	13 3%	29 1%	5 6%	<0.001	9 3%	33 1%	0.032	13 2%	29 1%	0.049

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.
Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 7
Experiences of suicidality and self-harm amid COVID-19 pandemic.

	Total sample (n = 3000)	Gender Male (n = 1492)	Gender Female (n = 1486)	p value	LGBT2Q+ Yes (n = 232)	LGBT2Q+ No (n = 2750)	p value	Income <$25 K (n = 253)	$25-<$50 K (n = 497)	$50 K-<$100 K (n = 990)	$100 K+ (n = 1261)	p value	Ethnicity VM (n = 451)	NVM (n = 2050)	IND (n = 90)	p value	Disability Yes (n = 299)	No (n = 2672)	p value	Pre-existing mental health condition Yes (n = 568)	No (n = 2404)	p value
Experienced suicidal thoughts/feelings	192 6%	97 6%	95 6%	0.176	33 14%	159 6%	<0.001	35 14%	35 7%	67 7%	54 4%	<0.001	26 6%	117 6%	14 16%	<0.001	44 15%	145 5%	0.000	103 18%	86 4%	<0.001
Deliberately hurt myself	58 2%	30 2%	28 2%	0.483	16 7%	42 2%	<0.001	4 1%	10 2%	22 2%	22 2%	0.850	17 4%	30 2%	4 4%	0.001	10 3%	48 2%	0.060	23 4%	34 1%	<0.001

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.
Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

4. Discussion

The mental health impacts of COVID-19 are widespread globally. People are struggling with greater levels of stress, worry, anxiety, and depression (Angus Reid Institute, 2020; Morneau Shepell, 2020). Yet, there is a paucity of empirical data exploring *who* is most impacted and elucidating ways that the pandemic is interfacing with existing health, social, and structural inequities that produce even poorer outcomes for some populations. This evidence is critical to informing equity-oriented public health responses to protect and promote population mental health through the pandemic and beyond.

In this paper, we describe findings from the first wave of our nationally representative monitoring study examining the mental health impacts of COVID-19 among those living in Canada. We identified impacts on mental health, emotional responses, stress, coping, substance use, suicidality, and self-harm. Further, responsive to global appeals for a focus on inequities associated with the pandemic (Laurencin and McClinton, 2020; United Nations, 2020), our analyses uncovered differential mental health impacts by gender, sexual orientation, household income, ethnicity, mental health status, and disability status. To our knowledge, this study is among the first to provide comprehensive empirical evidence on the differential mental health impacts of COVID-19; thus, documenting the potential for widening mental health inequities among structurally vulnerable populations.

Consistent with other national-level mental health survey data (Angus Reid Institute, 2020; Morneau Shepell, 2020; Findlay and Arim, 2020; Cowan, 2020), our study shows that populations in Canada are experiencing a deterioration in mental health and coping ability in the context of the pandemic. Overall, people are experiencing heightened challenging emotions compared to positive emotions. The greatest sources of stress relate to the physical impacts of the virus and financial concerns, including employment insecurity. This is particularly concerning amidst our findings that suicidal thoughts and self-harm are alarmingly high. Indeed, unemployment is a significant moderator of suicide, with McIntyre and colleagues projecting suicide mortality to rise dramatically due to unemployment resulting from the pandemic (McIntyre and Lee, 2020). Those who experience vulnerabilities due to mental health or disability, income, ethnicity, sexuality, or gender are more likely than their counterparts to endorse mental health deterioration, challenging emotions, difficulties coping, suicidal thoughts, and self-harm.

In addition to findings directly examining mental health impacts, our study identified several concerning outcomes that place populations at increased risk for poor mental health. Specifically, nearly one in five participants identified worry about having enough food to meet their household's basic needs. This was further magnified among vulnerable groups, including those in the lowest income category, people with a disability, and racialized and Indigenous peoples. The relationship between food insecurity and mental health is well-established and has shown to be independently associated with experiences of mental distress and mental health conditions (Friel et al., 2014). Furthermore, racialized and Indigenous groups were over two times more likely than their non-visible minority counterparts to report fear of physical or emotional domestic violence, which is strongly linked to persistent adverse mental health outcomes, particularly for women (Howard et al., 2010).

In alignment with UK-based findings from Cowan and colleagues, which sampled the general population and those with lived experience of mental health conditions, common coping strategies among our sample included exercise, connecting virtually with family/friends, and maintaining a healthy lifestyle (Cowan, 2020). While these are important individual-level strategies for supporting mental health, particularly among those with the health and social capital to engage in them, the pandemic further highlights that mental health is not simply an individual responsibility. Without collective or policy-level interventions operating to safeguard the mental health of entire populations, many solutions centred on the individual will remain inaccessible or ineffective. Indeed, as noted by other researchers focused on COVID-19 and structural vulnerability, the pandemic response would benefit by approaching COVID-19 using syndemics theory (Poteat et al., 2020; Horton, 2020).

Syndemics theory, first proposed by Merrill Singer, helps to uncover how health and social disparities emerge from the interactions between disease states and the social, environmental, and economic forces that worsen disease outcomes (Singer et al., 2017). In the context of this study, syndemics theory helps to explain why the mental health consequences of COVID-19 are more concentrated among structurally vulnerable groups, due to interactions between the virus and co-morbid health conditions, racism, poverty, social exclusion, and discrimination. Further, this theory lends support to the need for collectively oriented, policy level solutions to address the health of individuals and populations. As Richard Horton (2020) recently noted, "no matter how effective a treatment or protective a vaccine, the pursuit of a purely biomedical solution to COVID-19 will fail. Unless governments devise policies and programmes to reverse profound disparities, our societies will never be truly COVID-19 secure" (p. 874) (Horton, 2020).

As identified by Holmes and colleagues, efforts to address population mental health will be bolstered by global partnerships to facilitate data and solutions sharing (Holmes et al., 2020). Our partnership with the UK Mental Health Foundation contributes to this priority area. For example, we have already identified similar trends in our data, to the work in-progress by Kousoulis and colleagues (Kousoulis et al., 2020b), highlighting that certain groups are particularly vulnerable in both the UK and Canadian contexts (e.g., people with a disability or mental health condition, racialized groups). Future research will examine geographic similarities and differences in mental health more fulsomely and leverage these data to enhance outcomes globally.

To respond to the mental health crises resulting from the COVID-19 pandemic, a public health approach inclusive of mental health promotion, prevention, and treatment is needed. While prevention and treatment have historically received more attention and investment, mental health promotion represents a critical and underutilized element of a comprehensive mental health strategy. Mental health promotion is a strengths-based orientation aimed at enhancing positive mental health at the individual, community and population level, including for those experiencing the greatest vulnerability or risk. Positive mental health includes qualities such as self-esteem, coping ability, and sense of wellbeing (Herrman and Jané-Llopis, 2012).

Mental health promotion utilizes healthy public policy, which is distinguished by "explicit concern for health and equity in all areas of policy and by an accountability for health impact" (World Health Organization, 1995), as a key lever to strengthen individuals' and communities' ability to reduce structural barriers (e.g., poverty, discrimination) so that populations have the capacity and resources to optimize their mental health (Sunderland and Findlay, 2013). This approach is aligned with and responsive to calls to address the mental health impacts of the pandemic through action grounded in a public health and social determinants perspective, offering an evidence-informed framework to guide the "recovery" process (Haynes et al., 2020; Power et al., 2020; Douglas et al., 2020; Campion et al., 2020; Canadian Human Rights Commission, 2020; Holmes et al., 2020).

A mental health promotion approach is aligned with the growing grassroots movement in support of a "Just Recovery" to the pandemic. The Just Recovery movement is underpinned by six principles: 1) put people's health and wellbeing first, no exceptions; 2) strengthen the social safety net and provide relief directly to people; 3) prioritize the needs of workers and communities; 4) build resilience to prevent future crises; 5) build solidarity and equity across communities, generations, and borders; and 6) uphold Indigenous rights and work in partnership with Indigenous peoples (*Just Recovery*, 2020). Further research and theorizing are needed to explore how these approaches can be integrated to drive political will for upstream solutions that address the root

causes of mental health inequities.

While our study has many strengths, including the large and nationally representative sample, there are important limitations that warrant discussion. Specifically, the cross-sectional design of this study limits our ability to draw causal conclusions. This limitation will be partially addressed in forthcoming analyses when we have multiple waves of data to provide a picture of the impacts of the pandemic on mental health over time. Notably, however, other national polls conducted in Canada to examine the mental health impacts of the pandemic support our findings. Indeed, data from Statistics Canada provides an indication of the population mental health trends prior to and during the pandemic with a 14% decline in the proportion of the population describing their mental health as "very good" or "excellent" between 2018 and April 2020 (Findlay and Arim, 2020).

In addition to the limitations of a cross-sectional survey design, the aim of this research was not to diagnose mental health conditions and many of the adverse outcomes observed are expected within a pandemic and are likely transient. However, for some more vulnerable groups, challenges may persist and contribute to further deteriorations and widening mental health inequities. Respondents were asked to self-assess change in their mental health status from pre-COVID to current experience using a single-item measure, which may be considered a limitation to some. However, the mental health literature indicates that single item self-rated mental health measures are commonly used in population surveys and have demonstrated associations with multi-item measures (Ahmad et al., 2020). Further, the extant health literature suggests that single-item measures of self-perceived health status can be valid and reliable, while also sensitive to detecting change over time (Macias et al., 2015).

This survey was based on a previously implemented survey on the mental health consequences of COVID-19 in the UK. Given the aim to rapidly measure and monitor the mental health impacts of the pandemic in Canada, we did not pilot the adapted items modified for a Canadian context. However, the diversity of our study team, including interdisciplinary researchers, UK and Canadian mental health advocacy organizations, and people with lived experience of mental health challenges, provided confidence in the items developed. Further refinements will be made based on Wave 1 data in preparation for Wave 2 data collection. Additionally, while our sample was representative of the population of Canada by age, gender, region and income, other characteristics may not have been representative. For example, our sample was not representative of the overall population of Canada for ethnicity, with some "ethnic groups" underrepresented in our sample. However, given our large sample sizes, we retained the statistical power needed to conduct our analyses of interest for this paper. There is also the potential for selection bias within our sample. While oversampling and community partnerships were used to mitigate selection bias and minimize possible technology barriers, it is possible that those who participated in the survey differed from the overall Canadian population on key measures. Additional strategic waves of data collection will enhance examinations of data trends over time and strengthen confidence in observed outcomes. This will be important as we move to provide evidence to directly guide policy decision making to enhance population mental health. Further, while we have identified a number of "categories" of vulnerability, these are not mutually exclusive and the intersections, or experiences of multiple vulnerabilities, are likely to highlight even greater disparities (Cairney et al., 2014). While such analyses were not possible given the breadth of this paper, future research utilizing an intersectional approach to examine the mental health impacts for those who experience multiple vulnerabilities is needed and will be addressed in forthcoming papers.

5. Conclusions

The Canadian mental health system has long been identified as overburdened and not equipped to respond to the underlying social and structural conditions that create vulnerability for adverse mental health outcomes. Further, mental health challenges due to the COVID-19 pandemic are disproportionally impacting those who have been systematically and structurally oppressed. An equity-oriented public health approach informed by syndemics theory and that moves beyond prevention and treatment to include initiatives grounded in mental health promotion science is needed. A comprehensive approach holds promise for guiding institutional and government-level policy solutions towards the mental health crisis, characterized as the "4th wave" of the COVID-19 pandemic. Such an approach will leverage the full range of solutions needed to mitigate the growing mental health inequities that are poised to impact populations globally, throughout the course and aftermath of the pandemic.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ypmed.2020.106333.

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