Public perceptions of psychiatric, justice-involved, and elderly populations during the COVID-19 pandemic

Luiza Paul Géa [a,b,1], Casey Upfold [a,1], Aamna Qureshi [a], Heather Marie Moulden [a,b], Mini Mamak [a,b], John McDonald Wilson Bradford [a,b], Gary Andrew Chaimowitz [a,b,*]

[a] *Forensic Psychiatry Program, St. Joseph's Healthcare Hamilton – West 5th Campus, 100 West 5th Street, Hamilton, ON, L8N3K7, Canada*
[b] *Department of Psychiatry and Behavioural Neuroscience, McMaster University, 1280 Main Street West, Hamilton, ON, L8S4L8, Canada*

ABSTRACT

The novel coronavirus disease (COVID-19) has had a significant global impact, with all countries facing the challenge of mitigating its spread. An unprecedented shortage of medical resources has raised concerns regarding allocation and prioritization of supplies, which may exacerbate social discrepancies for already vulnerable populations. As public opinion can impact healthcare policies, we aimed to characterize perceptions of psychiatric, forensic psychiatry, correctional, and elderly populations regarding COVID-19-related issues. This web-based study recruited participants (n = 583) from the general population in North America. The survey included perceptions of the pandemic, hypothetical scenarios on resource prioritization, and Likert scale questions. The majority of participants were cisgender female (72.7%), aged 31–74 years (80.0%), married (48.0%), retired (52.7%), resided in Canada (73.9%), had a college/university degree (50.9%) and had never worked in healthcare (66.21%). Most respondents reported not having a criminal history (95.88%), or a psychiatric disorder (78.73%). Perceptions of vulnerable populations were significantly different for resource allocation and prioritization (e.g., ventilator and vaccine resources, all p < 0.001). Healthcare workers and the elderly were commonly ranked the highest priority for resources, while forensic psychiatry and correctional populations were given the lowest priority. A high rate of disagreement was found for the more stigmatizing questions in the survey (all p < 0.0001). Our results suggest that perception from members of the general public in North America is aligned with current practices for resource allocation. However, individuals that already face social and health disparities may face additional opposition in decision-making for COVID-19 resources.

1. Introduction

On March 11, 2020, the novel coronavirus disease (COVID-19) was declared a pandemic (WHO, 2020a). As of the date of this publication, countries continue to confront varying degrees of infection rates, and numerous protective measures remain in place to mitigate the spread of the virus. Previous literature has demonstrated that citizen compliance with preventative measures is influenced by attitudes toward their government and government policies (Gesser-Edelsburg et al., 2020; Salimi et al., 2020). Moreover, research regarding health crises response has shown that the success of healthcare policies relies, in part, on the public's perception of personal and societal risk (Bavel et al., 2020; Byrd and Białek, 2021; Dryhurst et al., 2020). During the current COVID-19 pandemic, risk perception is suggested to be influenced by personal

experience, values, and societal and cultural norms (Al-Hasan et al., 2020; Dryhurst et al., 2020). Recent research has demonstrated a link between these factors, risk perception about COVID-19 and the propensity to comply with behavioural recommendations (Al-Hasan et al., 2020; Tomczyk et al., 2020). Undoubtedly, public perceptions toward policies can alter behaviour and, therefore, the spread of the virus.

As public perceptions are likely to affect behaviour during this pandemic, it is also vital to investigate public perceptions of vulnerable populations during this time to ensure that these groups are not facing additional impediments to their care. Current evidence suggests that vulnerable populations, such as the elderly, psychiatric, and justice-involved individuals, have been disproportionately affected by COVID-19 (Ayalon et al., 2020; Fiorillo and Gorwood, 2020; Kinner et al., 2020; Simpson et al., 2020). It has been suggested that the pandemic and

associated preventive measures (e.g., physical distancing) have reinforced symptom severity and psychosocial stress in those with psychiatric disorders (Favreau et al., 2021; Quittkat et al., 2020) and intensified ageism (Cohn-Schwartz and Ayalon, 2021; Swift and Chasteen, 2021). Also, it has exacerbated challenges faced by justice-involved populations at correctional and forensic psychiatric settings (e.g., detachment and limited communication with family and friends) and upon reentering the society (e.g., increased suicide risk) (Kennedy et al., 2020; Maycock, 2021; Mitchell et al., 2021).

Perceived responsibility of personal and public protection might reinforce stigmatizing views and the salience of group differences (Ayalon et al., 2020; Logie and Turan, 2020; Tomczyk et al., 2020). Certain groups may be devalued, labelled irresponsible, or viewed as less of a priority for resources (Chaimowitz et al., 2021; Tomczyk et al., 2020). As the burden on the healthcare system and allocation of resources remain critical issues, ethical questions have arisen regarding the prioritization of resources such as intensive care unit beds, ventilators, and vaccines. The allocation of resources has the potential to highlight social discrepancies for already vulnerable and stigmatized populations (Buckwalter and Peterson, 2020; Chaimowitz et al., 2021). However, public perceptions during the COVID-19 pandemic toward specific vulnerable populations remain unknown. Thus, we aimed to characterize North American public perceptions towards psychiatric, forensic psychiatric, correctional, and elderly populations on COVID-related issues.

2. Methods

2.1. Design and participants

This cross-sectional web-based survey study was conducted from August 10 to December 6, 2020. The anonymous online survey was posted on social media platforms. Paid advertisements were posted on Facebook and Instagram, and free posts were published on Reddit (subreddits *Psychology*, *ForensicPsych*, *SampleSize*, *Mentalhealth*, *Mentalillness*, *OnlineSurveys*, and *PsychologyResearch*). Participants consisted of individuals recruited from the general population 18 years of age or older, who live in Canada and the United States of America (US), and have provided informed consent to participate in the study. No compensation was provided to the respondents, and only participants who completed the survey were included in the data analysis. The study was carried out in accordance with the latest version of the Declaration of Helsinki and approved by the Hamilton Integrated Research Ethics Board (HiREB, project #11009).

2.2. Measures

Online surveys and data collection were performed using Checkbox™ (Checkbox Survey Inc.). After clicking on the survey link on social media, participants were redirected to the survey webpage. The survey consisted of (1) 20 questions on sociodemographic characteristics and personal history, (2) one question about perception of the pandemic, (3) four hypothetical scenario questions on resource priority during the pandemic, and (4) 24 Likert scale questions. For the last two parts, definitions of the vulnerable populations (i.e., elderly, psychiatric, correctional and forensic psychiatric populations) were provided on each survey page. The estimated time for completion was 10 min.

2.2.1. Sociodemographic and personal history questionnaire

Twelve sociodemographic questions pertain to characteristics such as gender, age, education level, employment in healthcare, and residence location (Table 1). Eight questions inquired whether participants were familiar with the vulnerable population, whether they were considered part of the vulnerable population, had personal experience with the vulnerable population, or a partner/family member included in the vulnerable population (Table 2).

Table 1
Sociodemographic characteristics of the sample.

	Responses, n (%)
Overall	585 (100)
Gender	
Cisgender Female	424 (72.73)
Cisgender Male	132 (22.64)
Transgender Female	6 (1.03)
Transgender Male	3 (0.51)
Other/Unknown	18 (3.09)
Age (years)[a]	63 (54–69)
Ethnicity	
African	1 (0.17)
Asian	7 (1.20)
Canadian	36 (6.17)
European	491 (84.22)
First Nations	15 (2.57)
Hispanic	8 (1.37)
Other/Unknown	25 (4.29)
Religion	
Agnosticism	25 (4.29)
Atheism	64 (10.98)
Buddhism	5 (0.86)
Catholicism/Christianity	313 (53.69)
Hinduism	1 (0.17)
Islam	5 (0.86)
Judaism	10 (1.72)
None	83 (14.24)
Other/Unknown	77 (13.21)
Marital Status	
Partnered (dating, engaged, common-law or married)	350 (60.03)
Single	103 (17.67)
Divorced, or widowed	130 (22.30)
Education Level	
Completed Grade 8	1 (0.17)
Some High School (Grades 9–11)	14 (2.4)
Graduated from High School, or Equivalent	104 (17.84)
Vocational, Trade or Business School	52 (8.92)
College	133 (22.81)
University (BSc/BA)	164 (28.13)
Graduate/Professional School (MA/MSc, PhD, MBA, MD)	115 (19.73)
Employment Status	
Employed	189 (32.42)
Unemployed (student, homemaker or unemployed)	87 (14.92)
Retired	307 (52.66)
Annual Income	
<$25,000	146 (25.04)
$25,001–50,000	187 (32.08)
$50,001–75,000	126 (21.61)
$75,001–100,000	68 (11.66)
$100,001 plus	56 (9.61)
Household	
Own	392 (67.24)
Rent	170 (29.16)
Political Ideology	
Very conservative	25 (4.29)
Conservative	85 (14.58)
Moderate	176 (30.19)
Liberal	188 (32.25)
Very Liberal	109 (18.70)
Country of Residency	
Canada	431 (73.93)
United States	152 (26.07)
Canada Regions	
Atlantic	28 (6.49)
Central	227 (52.67)
Prairie	83 (19.26)
West Coast	92 (21.35)
North	1 (0.23)
US Regions	
Northeast	22 (14.48)
Midwest	36 (23.71)
South	49 (32.26)
West	45 (29.60)
COVID-19 Pandemic Perception	
Managed	210 (36.02)
Getting better	86 (14.75)

Table 1 (*continued*)

	Responses, n (%)
Getting worse	214 (36.71)
Severe	56 (9.61)
I don't know	17 (2.92)
Managed	210 (36.02)

[a] Data expressed as median (quartile 1-quartile 3).

Table 2
Background characteristics of the sample related to the vulnerable populations.

Question	Responses, n (%)
"Have you ever worked in healthcare?"	
Current	48 (8.23)
Past	149 (25.56)
Never	386 (66.21)
"Do you know what a correctional population is?"	
Yes	319 (54.72)
No	174 (29.85)
I have some idea	90 (15.44)
"Do you have a criminal history?"	
Yes	24 (4.12)
No	559 (95.88)
"Do you have an immediate family member or a partner/spouse that has a criminal history?"	
Family member	56 (9.61)
Partner/Spouse	2 (0.34)
Both	4 (0.69)
No	508 (87.14)
I don't know	13 (2.23)
"Do you have a diagnosis of a mental disorder?"	
Yes	124 (21.27)
No	459 (78.73)
"Do you have an immediate family member or partner/spouse diagnosed with a mental disorder?"	
Family member	152 (26.07)
Partner/Spouse	26 (4.46)
Both	13 (2.23)
No	361 (61.92)
I don't know	31 (5.32)
"Do you know what a forensic psychiatric patient is?"	
Yes	276 (47.34)
No	146 (25.04)
I have some idea	161 (27.62)
"Do you have a history of forensic psychiatry involvement?"	
Past/Current staff	12 (2.06)
Past/Current patient	3 (0.51)
No	568 (97.43)
"Do you have an immediate family member or partner/spouse that is involved in forensic psychiatry (i.e., as a patient or career)?"	
Family member	12 (2.06)
Partner/Spouse	1 (0.17)
Both	0 (0.0)
No	552 (94.68)
I don't know	18 (3.09)

2.2.2. COVID-19 perception

One question was included about participants' perception of the COVID-19 pandemic in the province or state where they live.

2.2.3. Resource allocation scenarios

Four hypothetical scenario questions were created for the current study (Supplementary material). First, participants were asked to rank the given populations in terms of priority for vaccination from first to last. Second, participants were asked to rank the given populations in terms of priority for ventilators from first to last. Third, participants were presented with a scenario about resource allocation, in which they were given characteristics of populations (e.g., criminal history, over 65 years old), and were asked to decide whether populations with that characteristic should be considered for "more resources", "less resources", or if that characteristic "should not be taken into consideration". Healthcare workers, children under the age of 10, and physically

healthy populations were also included in these three scenarios above. Fourth, participants were asked to allocate either "10%", "20%", "30%", or "40%" of $500,000 to each of the four vulnerable populations for support and resources related to COVID-19.

2.2.4. Perceptions toward vulnerable populations questionnaire

Twenty-four Likert scale questions were used to assess participants' perceptions toward the four vulnerable populations. The questions were created for the current study. Five questions had the same question stem and were asked for each vulnerable population. These five questions asked the extent to which participants agree with stigmatizing statements, such as whether the vulnerable population: (1) will follow the proper COVID-19 related recommendations, (2) place a burden on the healthcare system, (3) should be isolated for the public's protection, (4) should receive less care if they test positive for COVID-19, and (5) should be considered less of a focus than a younger healthy population because they are dangerous and violent or have lived a long life. The four remaining questions were different and specific for each vulnerable population. The order of the questions was randomized. The 5-point Likert scale ranged from 1 = "disagree", 2 = "somewhat disagree", 3 = "neutral", 4 = "somewhat agree", and 5 = "agree".

2.3. Data analysis

All responses were exported from Checkbox™, and incomplete surveys were excluded. Consent, age criteria, and time spent on the survey were verified, and open-ended responses were coded into existing or new categories.

Frequency distributions and means were calculated for participants' sociodemographic characteristics, and comparisons were carried out using Pearson Chi-Square (χ^2). Ranking analysis was performed for the scenarios and the Likert scale questions using Friedman's ANOVA test followed by Wilcoxon signed-ranks post hoc test. To account for multiple comparisons, Bonferroni adjustment was performed, and the appropriate p-value was calculated ($p < 0.008$); if not otherwise specified, $p < 0.05$ was considered. Additionally, reliability analysis was performed and revealed a high level of internal consistency for these questions (24 items) with this specific sample (Cronbach's $\alpha = 0.92$). Mann-Whitney *U* test was performed to compare participants' perceptions depending on personal history (criminal history, psychiatric disorder diagnosis, forensic psychiatry background, and age group as factors). Data are expressed as absolute and relative frequencies for categorical variables, mean and 95% confidence interval (CI) for ordinal, and median (quartile 1-quartile 3) for numerical. All statistical analyses were conducted using SPSS® version 26 (IBM® Corp.).

3. Results

3.1. Sociodemographic Characteristics

From a total of 3283 responses, data from 583 complete surveys were extracted and included in the analysis. The majority of respondents were cisgender female (72.73%), aged 31.4–74 years (80%), married (48.03%), retired (52.66%) and had a college or university degree (50.94%) and an annual income of up to $75,000 (78.73%).

Most participants were from Canada (73.93%). The majority of Canadian participants resided in Ontario (46.17%) and British Columbia (21.35%). Participants from the US were mainly from Washington (8.55%) and California (6.58%). More than half of the sample self-identified as being European (84.22%), Catholic/Christian (53.69%), and politically moderate or liberal (62.44%). The median time spent completing the survey was 14.5 min (11.51–18.99). The frequencies and descriptives are presented in Table 1.

3.2. Personal history with vulnerable populations

Most respondents never worked in healthcare (66.21%). More than half of respondents knew or had some idea of the correctional population's definition (70.16%). The majority of respondents had no criminal record (95.88%) and did not have a close relative or partner/spouse with a criminal history (87.14%). The majority of the sample reported having no diagnosis of psychiatric disorder (78.73%). However, 32.92% of respondents reported having a family member and/or spouse/partner diagnosed with a psychiatric disorder. Although the vast majority of the sample did not have a background in forensic psychiatry (97.43%) or a close relative or partner/spouse with one (94.68%), most respondents declared a full or partial understanding of the meaning of a forensic psychiatry patient (74.96%). The complete frequencies are available in Table 2.

3.3. COVID-19 perception

The survey was conducted between the first and second waves of the COVID-19 pandemic in North America (Fig. 1a). Most respondents indicated that the pandemic was "managed" (36.02%) or "getting worse" (36.71%) where they live (Table 1). A significant association was observed when perceptions were analyzed by country ($\chi^2(4) = 66.327$, $p < 0.0001$) (Fig. 1b). The majority of Canadian participants responded that the pandemic was "getting worse" (40.14%) or "managed" (39.91%), followed by "getting better" (13.23%), "severe" (4.18%), and "I don't know" (2.55%). The highest response rate from participants from the US was observed for "getting worse" (26.97%), followed by "severe" (25.00%), "managed" (25.00%), "getting better" (19.08%), and "I don't know" (3.95%).

3.4. Resource allocation scenarios

3.4.1. Vaccination priority

Friedman's test indicated a significant difference in perceived vaccination priority for the different populations ($\chi^2(6) = 1732.67$, $p < 0.0001$). On average, healthcare workers and the elderly populations were more likely to be ranked first (Table 3). Post hoc analysis between the vulnerable populations and all pairwise comparisons were significant (all $p \leq 0.007$).

3.4.2. Ventilator priority

A significant difference was observed between populations ($\chi^2(6) = 1691.87$, $p < 0.0001$, Table 3). Healthcare workers were ranked the highest, followed by children under the age of 10. Significant post hoc comparisons were found between the vulnerable populations of interest

(all $p < 0.001$), except when forensic psychiatric patients were compared to the correctional population ($Z = -1.15$, $p = 0.251$). On average, both forensic and correctional populations were assigned to be last for ventilator priority.

3.4.3. Resource allocation

For almost all populations, participants chose that the populations should be considered for more resources. Being a forensic psychiatry patient or having a criminal history were more likely to be answered as "should not be taken into consideration" for resource allocation decisions. Friedman's test revealed a statistical difference in responses for resource allocation depending on the population ($\chi^2(6) = 946.45$, $p < 0.0001$, Table 3). Significant post hoc comparisons were observed between the vulnerable populations (all $p < 0.001$).

3.4.4. Financial Support

A significant difference was found for the percentages allocated to these populations ($\chi^2(3) = 727.66$, $p < 0.0001$, Table 3). On average, a higher percentage of financial support was assigned to the elderly. Post hoc pairwise comparisons were significant between all groups ($p \leq 0.001$).

3.5. Public perceptions toward vulnerable populations

3.5.1. Burden on the healthcare system

Participants mostly disagreed that the vulnerable populations are putting a burden on the healthcare system. The highest level of disagreement with this statement was found for the elderly population (mean = 1.85, 95% CI 1.75–1.95; Table 4). Friedman's test indicated a significant difference in perceptions towards the different populations ($\chi^2(3) = 83.47$, $p < 0.0001$). Post hoc analyses were significant for most comparisons (all $p < 0.001$), while no difference was observed in perceptions between psychiatric and correctional populations ($Z = -0.61$, $p = 0.545$), indicating a similar response for both populations.

3.5.2. Following proper recommendations

On average, respondents disagreed with the statement that the vulnerable populations are less likely to follow public health and social measures for COVID-19 (e.g., physical distancing and wearing masks). Individuals were more likely to disagree for the elderly (mean = 1.72, 95% CI 1.62–1.81) and correctional (mean = 2.89, 95% CI 2.78–3.00) populations ($\chi^2(3) = 451.38$, $p < 0.0001$), while mean values were higher for forensic psychiatric and psychiatric populations. This finding reveals that individuals with psychiatric disorders were considered less likely to follow proper recommendations that the other populations
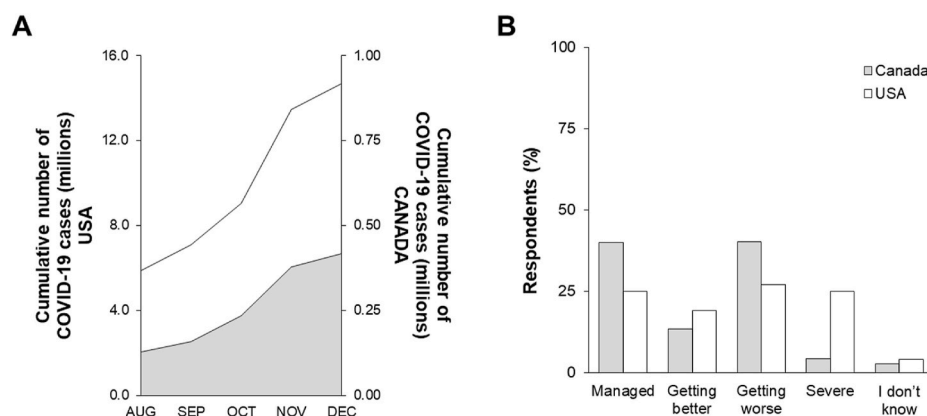

Fig. 1. Perception of COVID-19 pandemic in North America. **A.** Cumulative number of COVID-19 cases in Canada (grey) and the US (white) when the survey was conducted (obtained from publicly available data - Allen et al., 2021; Public Health Agency of Government of Canada, 2020). **B.** Relative response rates of perceptions of the pandemic per country.

Table 3
Public opinion on resource allocation among vulnerable populations.

Scenario/Populations	Mean (95% CI)	Friedman's test (X², df, p)
Vaccination priority[a]		
Healthcare workers	1.39 (1.32–1.46)	*1732.67, 6, < 0.0001*[e]
Elderly (≥65 years)	2.34 (2.25–2.44)	
Children (<10 years)	4.30 (4.14–4.46)	
Individuals with psychiatric disorders	4.52 (4.44–4.61)	
Correctional population	5.08 (4.95–5.21)	
Physically healthy	5.10 (4.97–5.24)	
Forensic psychiatric patients	5.25 (5.15–5.26)	
Ventilator priority[a]		
Healthcare workers	1.62 (1.54–1.71)	*1691.87, 6, < 0.0001*[f]
Children (<10 years)	2.87 (2.74–3.01)	
Elderly (≥65 years)	3.36 (3.21–3.51)	
Physically healthy	4.15 (4.01–4.29)	
Individuals with psychiatric disorders	4.56 (4.48–4.65)	
Correctional population	5.68 (5.58–5.79)	
Forensic psychiatric patients	5.74 (5.65–5.84)	
Limited healthcare resource allocation[b,d]		
Healthcare workers	2.81 (2.77–2.86)	*946.45, 6, < 0.0001*[g]
Elderly (≥65 years)	2.60 (2.55–2.66)	
Children (<10 years)	2.54 (2.47–2.60)	
Individuals with psychiatric disorders	2.19 (2.12–2.26)	
Physically healthy	2.12 (2.05–2.19)	
Forensic psychiatric patients	1.96 (1.89–2.03)	
Correctional population	1.86 (1.79–1.92)	
Percentage of financial support allocation[c,d]		
Elderly (≥65 years)	3.45 (3.38–3.52)	*727.66, 3, < 0.0001*[h]
Individuals with psychiatric disorders	2.54 (2.47–2.61)	
Correctional population	1.95 (1.88–2.02)	
Forensic psychiatric patients	1.80 (1.74–185)	

[a] Populations are shown as ranked by respondents from first to last (ranks 1 to 7).

[b] Mean ranks were calculated based on a 3-point scale (1 – "No, should not be considered", 2 – "Yes, should be considered for LESS resources", 3 – "Yes, should be considered for MORE resources").

[c] Mean ranks were calculated based on a 4-point scale (1 – "10%", 2 – "20%", 3 – "30%", 4 – "40%").

[d] Populations are ranked according to more resources allocated from first to last.

[e] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −19.78, <0.001; Correctional x Forensic Psychiatry, −2.71, 0.007; Psychiatry x Forensic Psychiatry, −10.11, <0.001; Correctional x Elderly, −18.89, <0.001; Psychiatry x Elderly, −18.64, <0.001; Psychiatry x Correctional, −6.02, <0.001.

[f] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −17.72, <0.001; Correctional x Forensic Psychiatry, −1.15, 0.251; Psychiatry x Forensic Psychiatry, −15.86, <0.001; Correctional x Elderly, −16.58, <0.001; Psychiatry x Elderly, −11.42, <0.001; Psychiatry x Correctional, −12.97, <0.001.

[g] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −13.44, <0.001; Correctional x Forensic Psychiatry, −3.80, <0.001; Psychiatry x Forensic Psychiatry, −7.60, <0.001; Correctional x Elderly, −14.86, <0.001; Psychiatry x Elderly, −10.24, <0.001; Psychiatry x Correctional, −10.15, <0.001.

[h] Wilcoxon post hoc tests with Bonferroni correction: Elderly x Forensic Psychiatry, −18.59, <0.001; Correctional x Forensic Psychiatry, −3.45, 0.001; Psychiatry x Forensic Psychiatry, −13.29, <0.001; Correctional x Elderly, −17.56, <0.001; Psychiatry x Elderly, −13.59, <0.001; Psychiatry x Correctional, −9.40, <0.001.

(Table 4). Most post hoc comparisons were significant (all $p < 0.001$), but not between individuals with psychiatric disorders and forensic psychiatry patients ($Z = -0.19$, $p = 0.852$).

3.5.3. Isolation from public

Respondents mainly disagreed that vulnerable populations should be kept away from the rest of society during the pandemic, with the highest rate of disagreement found for the elderly (mean = 1.93, 95% CI 1.83–2.03) and individuals with psychiatric disorders (mean = 1.98, 95% CI1.88–2.07). A statistically significant difference was found for responses between vulnerable populations ($\chi^2(3) = 482.78$, $p < 0.0001$, Table 4), and most post hoc analyses were significant (all $p < 0.001$). Non-significant comparisons were observed between correctional and forensic psychiatry populations (Z-1.41, $p = 0.159$) and between the psychiatric and elderly populations ($Z = -0.95$, $p = 0.345$). The latter indicates that there was a higher response rate of agreement for populations with a criminal history.

3.5.4. Receiving healthcare for COVID-19

The majority of participants disagreed that the vulnerable populations should receive less care than the rest of the population if they test positive for COVID-19. Friedman's test revealed a significant difference in responses depending on the vulnerable population ($\chi^2(3) = 108.65$, $p < 0.0001$, Table 4). The highest disagreement rates were found for the elderly (mean = 1.44, 95% CI 1.37–1.51) and psychiatric (mean = 1.49, 95% CI 1.42–1.56) populations. Thus, pairwise comparisons were significant for most groups, but not between psychiatric and elderly populations ($Z = -1.43$, $p = 0.154$). Lower response rates of disagreement were observed for vulnerable populations with a criminal history.

3.5.5. Focus on young and healthy populations

On average, respondents disagreed that the pandemic resources should focus on young and healthy individuals compared to the vulnerable populations. A significant difference in responses was found ($\chi^2(3) = 203.69$, $p < 0.0001$, Table 4). Higher response rates of disagreement were found for the elderly (mean = 1.44, 95% CI 1.37–1.51) and individuals with psychiatric disorders (mean = 1.49, 95% CI 1.42–1.56). Hence, post hoc analyses were significant (all $p < 0.001$), except for the comparison between the psychiatric and the elderly populations ($Z = -2.15$, $p = 0.032$).

Table 4
Public perceptions towards vulnerable populations.

Statement/Populations	Respondents, n (%)[a]					Mean score (95% IC)	Friedman's test (X^2, df, p)
	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree		
"___ are putting a negative burden on the healthcare system during the pandemic."							
Elderly (≥65 years)	19 (3.26)	79 (13.55)	49 (8.40)	82 (14.07)	354 (60.72)	1.85 (1.75–1.95)	*83.48, 3, < 0.0001*[b]
Correctional population	38 (6.52)	48 (8.23)	132 (22.64)	99 (16.98)	266 (45.63)	2.13 (2.02–2.23)	
Individuals with psychiatric disorders	16 (2.74)	69 (11.84)	152 (26.07)	102 (17.50)	244 (41.85)	2.16 (2.07–2.26)	
Forensic psychiatric patients	28 (4.80)	62 (10.63)	183 (31.39)	94 (16.12)	216 (37.05)	2.30 (2.20–2.40)	
"___ are less likely to follow the proper recommendations during a pandemic."							
Elderly (≥65 years)	25 (4.29)	51 (8.75)	41 (7.03)	84 (14.41)	382 (65.52)	1.72 (1.62–1.81)	*451.38, 3, < 0.0001*[c]
Correctional population	93 (15.95)	127 (21.78)	116 (19.90)	116 (19.90)	131 (22.47)	2.89 (2.78–3.00)	
Individuals with psychiatric disorders	93 (15.95)	198 (33.96)	109 (18.70)	85 (14.58)	98 (16.81)	3.177 (3.069–3.285)	
Forensic psychiatric patients	105 (18.01)	176 (30.19)	127 (21.78)	68 (11.66)	107 (18.35)	3.178 (3.068–3.289)	
"___ should be located/kept away from the rest of society during the pandemic for the public's protection."							
Elderly (≥65 years)	27 (4.63)	62 (10.63)	58 (9.95)	131 (22.47)	305 (52.32)	1.93 (1.83–2.03)	*482.78, 3, < 0.0001*[d]
Individuals with psychiatric disorders	22 (3.77)	60 (10.29)	94 (16.12)	113 (19.38)	294 (50.43)	1.98 (1.88–2.07)	
Correctional population	119 (20.41)	128 (21.96)	106 (18.18)	79 (13.55)	151 (25.90)	2.97 (2.85–3.10)	
Forensic psychiatric patients	90 (15.44)	138 (23.67)	158 (27.10)	108 (18.52)	89 (15.27)	3.06 (2.95–3.16)	
"___ should receive less care from healthcare workers than the rest of the population when they test positive for COVID-19."							
Elderly (≥65 years)	8 (1.37)	24 (4.12)	28 (4.80)	95 (16.30)	428 (73.41)	1.44 (1.37–1.51)	*108.65, 3, < 0.0001*[e]
Individuals with psychiatric disorders	7 (1.20)	11 (1.89)	63 (10.81)	98 (16.81)	404 (69.30)	1.49 (1.42–1.56)	
Forensic psychiatric patients	17 (2.92)	32 (5.49)	87 (14.92)	105 (18.01)	342 (58.66)	1.76 (1.67–1.85)	
Correctional population	32 (5.49)	39 (6.69)	75 (12.86)	105 (18.01)	332 (56.95)	1.86 (1.76–1.96)	
"Resources for the pandemic should focus on the young and healthy population, not ___ because they are dangerous and violent/have already lived a long life."							
Elderly (≥65 years)	15 (2.57)	42 (7.20)	58 (9.95)	109 (18.70)	359 (61.58)	1.71 (1.62–1.79)	
Individuals with psychiatric disorders	23 (3.95)	59 (10.12)	43 (7.38)	128 (21.96)	330 (56.60)	1.83 (1.73–1.92)	*203.69, 3, < 0.0001*[f]
Forensic psychiatric patients	32 (5.49)	66 (11.32)	84 (14.41)	108 (18.52)	293 (50.26)	2.03 (1.93–2.14)	
Correctional population	56 (9.61)	96 (16.47)	74 (12.69)	136 (23.33)	221 (37.91)	2.37 (2.25–2.48)	

[a] Scored as a 5-point scale (from 1 for "disagree" to 5 for "agree").
[b] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −7.23, <0.001; Correctional x Forensic Psychiatry −4.11 < 0.001; Psychiatry x Forensic Psychiatry, −3.69 < 0.001; Correctional x Elderly, −4.13, <0.001; Psychiatry x Elderly, −5.35, <0.001; Psychiatry x Correctional, −0.61, 0.545.
[c] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −15.41, <0.001; Correctional x Forensic Psychiatry, −4.77, <0.001; Psychiatry x Forensic Psychiatry, −0.19, 0.852; Correctional x Elderly, −13.18, <0.001; Psychiatry x Elderly, −15.31, <0.001; Psychiatry x Correctional, −4.50, <0.001.
[d] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −13.83, <0.001; Correctional x Forensic Psychiatry, −1.41, 0.159; Psychiatry x Forensic Psychiatry, −15.43, <0.001; Correctional x Elderly, −12.59, <0.001; Psychiatry x Elderly, −0.95, 0.345; Psychiatry x Correctional, −14.41, <0.001.
[e] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −6.24, <0.001; Correctional x Forensic Psychiatry, −2.82, 0.005; Psychiatry x Forensic Psychiatry, −7.01, <0.001; Correctional x Elderly, −7.24, <0.001, Psychiatry x Elderly, −1.43, 0.154, Psychiatry x Correctional, −8.36, <0.001.
[f] Wilcoxon post hoc tests with Bonferroni correction (Z, p): Elderly x Forensic Psychiatry, −3.59, <0.001; Correctional x Forensic Psychiatry, −7.51, <0.001; Psychiatry x Forensic Psychiatry, −8.44, <0.001; Correctional x Elderly, −8.17, <0.001; Psychiatry x Elderly, −2.15, 0.032; Psychiatry x Correctional, −12.46, <0.001.

3.6. Personal history and public perceptions

The following results are reported in Fig. 2. Regarding the correctional population, most participants disagreed with the statement, "I do not feel bad for inmates who get COVID-19 because they are in prison due to their own life choices". No significant difference in average response was found between respondents with a criminal history or a close relative with a criminal record and those without (U = 17,053.5, p = 0.100). Similarly, a high rate of disagreement was observed for the statement, "I do not feel bad for forensic psychiatry patients who get COVID-19 because they have a criminal history". No significant difference was found between respondents who indicated having a background or involvement with the forensic psychiatry system (U = 7133.0, p = 0.882).

Most respondents disagreed with the statement that "Mental health issues are less important during the pandemic compared to before the pandemic". Mann-Whitney *U* test revealed a significant difference in responses according to personal history (U = 33,616.5, p < 0.0001).
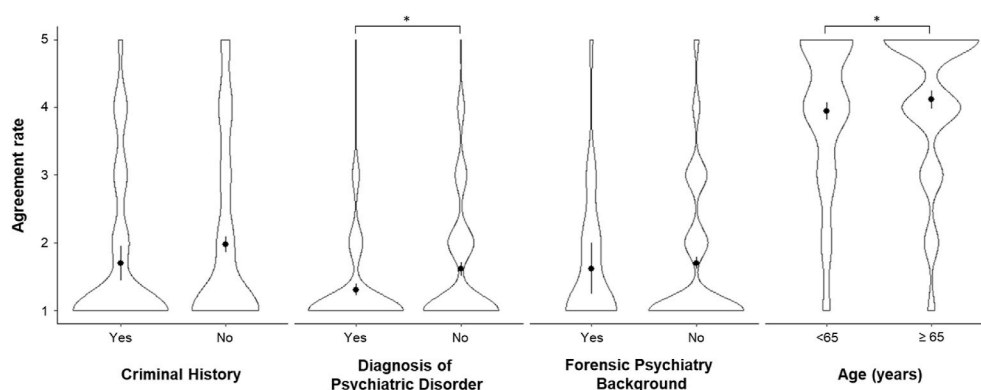
Fig. 2. Perceptions of correctional, psychiatry, forensic psychiatry and elderly populations (from left to right) according to respondents' personal history (x-axis). Response rates (white shapes) are shown according to a five-point Likert scale ranging from 1 (disagree) to 5 (agree) (y-axis). Mann-Whitney *U* test (*p < 0.05), and data expressed as mean (black dot) and 95% CI of the mean (vertical lines).

Specifically, participants who reported having a diagnosis of psychiatric disorder or a close relative with a psychiatric disorder were significantly more likely to disagree with the statement.

An overall high response rate of agreement was observed for the statement, "The elderly population should be a treatment priority during the pandemic". The comparison between participants under the age of 65 and aged 65 or older was significant (U = 38,228.5, p = 0.043), where older participants were more likely to agree with this statement.

4. Discussion

The COVID-19 pandemic has raised important ethical questions regarding resource allocation and healthcare prioritization. While most of the current literature has focused on the risk perception of contracting COVID-19, we aimed to provide an overview of public perceptions toward vulnerable groups, including individuals with psychiatric disorders, forensic psychiatry, correctional and elderly populations. Our results indicate that members from the public in North America agree on prioritizing healthcare workers and the elderly for limited COVID-19 resources over psychiatric and justice-involved populations. The majority of respondents disagreed with the more stigmatizing questions in the survey, albeit ranking the justice-involved and psychiatric populations last in the scenario questions. Interestingly, participants who had a psychiatric diagnosis or were over the age of 65 were found to respond more favourably to the psychiatric population and elderly population questions, respectively, than those without these characteristics.

Having a criminal history or psychiatric disorder are characteristics the public may consider in their evaluations of resource allocation, as observed in the scenario questions. There may be multiple factors that account for this finding. First, consistent with previous literature, public perceptions may be influenced by personal values and views toward governing jurisdictions and policies (Al-Hasan et al., 2020; Dryhurst et al., 2020; Eno Louden et al., 2021; Gesser-Edelsburg et al., 2020; Salimi et al., 2020). The allocation of resources has been heavily discussed in the media, healthcare settings, and politics (Han and Koch, 2020; Sandoiu, 2020). In 2020, the WHO and many scientific journals published guidelines to advise healthcare decision-making in the face of limited resources and severely ill patients during COVID-19 (Dos Santos et al., 2020; Emanuel et al., 2020; White and Lo, 2020; WHO, 2020b). Ethical considerations have included the principles of equality, utility, and prioritization of those considered to be most vulnerable or most ill (WHO, 2020b). Moreover, the use of a multi-principle allocation framework has been highly recommended (Emanuel et al., 2020; White and Lo, 2020). Nevertheless, policies have varied considerably between regions within countries (Piscitello et al., 2020; Sandoiu, 2020).

In the present study, scarce resources were more likely to be

allocated to healthcare workers, followed by the elderly for vaccination priority and children for ventilator priority. Respondents seemed to follow an ethical value of maximizing benefits regarding ventilators while prioritizing those at higher risk of developing severe infections to be vaccinated. Similarly, in a Canadian study, respondents prioritized populations vulnerable to physical consequences for vaccination compared to populations in settings prone to outbreaks (e.g., prisons) (Government of Canada, 2020). An additional study found that respondents approved the principle of maximizing benefits regardless of possible disadvantages it might pose to other vulnerable groups (Buckwalter and Peterson, 2020). Although this principle aims to preserve more lives or life-years, it might reinforce inequalities and disadvantages for other at-risk or marginalized populations.

Second, our results highlight that in making resource-related decisions, the public may be more likely to prioritize populations highly publicized as vulnerable. The media and healthcare authorities have consistently highlighted the elderly and healthcare workers as vulnerable during the pandemic (Bagcchi, 2020; Banerjee, 2020; Taylor et al., 2020; Vahia and Shah, 2020). Although psychiatric, forensic psychiatry, and correctional populations are known to be vulnerable to adverse outcomes during the pandemic, they have received less attention in the media (Chaimowitz et al., 2021). Previous research has demonstrated that individuals with pre-existing psychiatric disorders are more likely to contract COVID-19 in the community and are more vulnerable to adverse psychological and physical outcomes than the general population (Fiorillo and Gorwood, 2020; Yao et al., 2020), including being twice as likely to be at risk of mortality and/or hospitalization (Armitage and Nellums, 2020; Maripuu et al., 2021; Wang et al., 2021).

Correctional institutions have faced numerous challenges in mitigating the spread of the virus. With a high population density, physical distancing is challenging to implement. Additionally, correctional facilities are conducive to the rapid spread of infectious diseases (Kinner et al., 2020). Reported infection rates for incarcerated individuals have been 3–5.5 times higher than the general US population, exceeding 65–75% of some prison populations (Aspinwall and Neff, 2020; Oladeru et al., 2020; Rapisarda et al., 2020; UCLA, 2020). Forensic psychiatric patients have been met with similar challenges (Kennedy et al., 2020). In a recent study, almost a third of forensic patients were found to be at high risk for adverse outcomes if infected with COVID-19 (Basrak et al., 2021). Moreover, when restricted to hospital units, physical distancing becomes difficult, and patients are deprived of previous liberties, access to the community, and communication with friends and family (Simpson et al., 2020). Ultimately, restrictions can worsen symptoms, treatment adherence, and contribute to an increased illness burden. The public's perceptions toward resource allocation for these populations may be influenced by a general lack of knowledge about the vulnerabilities that correctional, forensic psychiatry, and psychiatric

populations face during the pandemic.

Third, stigmatization toward specific populations may influence perceptions about resource allocation. It is well understood that those with psychiatry disorders and justice involvement face stigmatization from some of the public and the media (Chaimowitz et al., 2021). In the current study, participants were more likely to agree with the stigmatizing questions for the correctional, psychiatric and forensic populations, and ranked them lower than physically healthy individuals in some scenarios. Having a criminal history might be a characteristic that people consider regarding their perceptions about prioritizing resources. Notably, the forensic psychiatry population may face more stigmatization due to having both criminal history and a psychiatric disorder.

4.1. Implications and future directions

It is imperative to understand public views toward vulnerable populations to monitor changing opinions and personal biases during the pandemic. Public perceptions can influence public policy and related decision-making; as such, public perceptions of vulnerable populations are essential to consider. A current example of vulnerable populations facing uncertainty in many countries can be seen in the lack of detail concerning when correctional populations will receive vaccines (CDC, 2020; Department of Health & Social Care, UK, 2021; Government of Ontario, 2020; Stanley-Becker, 2021). This lack of detail persists in the face of expert recommendations to include correctional populations in the first stages of vaccine administration (Siva, 2020). The decision to deliver vaccines to federal inmates in Canada caused online debate about which vulnerable populations should receive vaccines first (Johnson and Raymond, 2021). Public opinions that do not prioritize correctional populations for COVID-19 resources may increase stigmatization and engender more barriers to healthcare. This example illustrates the necessity of understanding public perceptions of specific populations during this pandemic so that any influence on healthcare decision-making can be monitored. Future studies must include other vulnerable groups that may face challenges in accessing healthcare and/or coping during health crisis situations. Furthermore, consultation with those populations impacted by current guidelines could be beneficial in improving resource allocation and triage criteria.

4.2. Strengths and limitations

To our knowledge, this study is the first of its kind, making it an important first step in examining public perceptions of psychiatric, correctional, forensic psychiatry and elderly populations concerning COVID-19 related issues. Additionally, the use of vignette-style scenario questions resembling situations that have arisen during the pandemic increased the study's ecological validity and allowed for comparisons to be made with real-life situations. The Likert scale questions also allowed for comparisons across vulnerable populations and with respect to the respondents' answers.

Some limitations should be acknowledged in our study. First, we observed a relatively low response rate (~18%). COVID-19 has been consistently discussed in the news and social media, which may result in many people experiencing information fatigue. It is possible that a similar phenomenon has happened with the overwhelming number of surveys available, which may reduce the number of participants in subsequent surveys. Additionally, our study contains sensitive topics involving ethical concerns. Thus, the nature of some questions could cause emotional distress or discomfort for some respondents, which might have contributed to the low response rate. Second, our findings must be interpreted with caution due to the limited representativeness of our sample. Despite our broad inclusion criteria and the convenience of non-probability sampling, coverage bias represents an important limitation. Some sociodemographic variables differ from census data in North America (Government of Canada, 2017; United States Census Bureau, 2019). For instance, the median age and female response rate

were higher in our sample. While individuals aged 65 and older and females represent ~45% and ~70%, respectively, of our sample, the rates for these groups are lower in Canada (aged 65 and older, 16.9%; and female, 50.9%) and US (aged 65 and older, 16.5%; and female, 50.8%). Survey advertisements on Facebook might have facilitated older participants' recruitment, as previously reported (King et al., 2014; Shaver et al., 2019). Still, some agreement is observed with census data and recent similar research. Over 80% have completed high school or higher degrees (97.4%; Canada = 81.5% and US = 88.0%) and have a median income between $25,000–50,000 (Canada = $34,204 and US = $62,843), more than 67% own their home (67.2%; Canada = 67.8% and US = 69.2%) and about half are partnered (59.8%; Canada = 49.9%). Online surveys recruiting general public from North America (Parsons Leigh et al., 2020; Singh et al., 2020) have also reported that the majority of respondents were females, aged 45 and older, Catholic/Christian, as well as had higher education and self-identified as European and having a more liberal political ideology. Coverage bias in web-based studies is linked to unequal access to electronic devices and the internet and disparities in usage style and frequency among the public (Fan and Yan, 2010). Still, non-probability sampling is a convenient exploratory approach that reduces respondent burden, consequently reaching legitimate subpopulation members (Lehdonvirta et al., 2021), but it must be interpreted with caution.

5. Conclusion

The COVID-19 pandemic has significant social implications. As resource allocation and prioritization have been a significant concern, inconsistent ethical guidelines may further affect already vulnerable and stigmatized populations. We have addressed four domains known to be contentious during this pandemic: vaccines, ventilators, financial support, triage criteria, and matters relevant to stigmatizing perspectives. Our results show that perceptions from members of the general public in North America are similar to approaches adopted for resource allocation during the COVID-19 pandemic. Specifically, triage frameworks for limited resources are based on the value of maximizing benefits (e.g., save more lives and more years of life) and instrumental value (e.g., COVID-19 testing, vaccination and personal protective equipment to healthcare workers) (Canadian Medical Association, 2020; McClung, 2020). However, individuals that already face social and health disparities might be further at-risk and marginalized.

The allocation of scarce resources is a difficult balancing act. We have already seen how decision-making is subject to public and political opinions (Emanuel et al., 2020; Siva, 2020). As such, a multi-principle approach should be prioritized so that vulnerable populations are not left out of the conversation. Given the increased discussion of vulnerable populations and evidence provided on the influence of public opinion, it is essential to capture the public perception of these vulnerable groups with a focus on COVID-19 related issues in an effort to mitigate adverse psychological and health outcomes.

Authors' contributions

Conceptualization and Methodology: all authors; Formal analysis and investigation: LPG, CU, and AQ; Writing - original draft preparation: LPG, CU, and AQ; Writing - review and editing: all authors; Funding acquisition: GAC; Supervision: HMM, MM, JMWB and GAC.

Declaration of interest

The authors declare no conflict of interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpsychires.2021.12.019.

References

Al-Hasan, A., Yim, D., Khuntia, J., 2020. Citizens' adherence to COVID-19 mitigation recommendations by the government: a 3-country comparative evaluation using web-based cross-sectional survey data. J. Med. Internet Res. 22 https://doi.org/10.2196/20634.

Allen, J., Almukhtar, S., Aufrichtig, A., Barnard, A., Bloch, M., Cahalan, S., Cai, W., 2021. Coronavirus in the U.S.: Latest Map and Case Count. The New York Times. https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html.

Armitage, R., Nellums, L.B., 2020. The COVID-19 response must be disability inclusive. Lancet Publ. Health 5, e257. https://doi.org/10.1016/S2468-2667(20)30076-1.

Aspinwall, C., Neff, J., 2020. These Prisons Are Doing Mass Testing for COVID-19 — and Finding Mass Infections. The Marshall Project. https://www.themarshallproject.org/2020/04/24/these-prisons-are-doing-mass-testing-for-covid-19-and-finding-mass-infections.

Ayalon, L., Chasteen, A., Diehl, M., Levy, B., Neupert, S.D., Rothermund, K., Tesch-Römer, C., Wahl, H.-W., 2020. Aging in times of the COVID-19 pandemic: avoiding ageism and fostering intergenerational solidarity. J. Gerontol. B Psychol. Sci. Soc. Sci. https://doi.org/10.1093/geronb/gbaa051.

Bagcchi, S., 2020. Stigma during the COVID-19 pandemic. Lancet Infect. Dis. 20, 782. https://doi.org/10.1016/S1473-3099(20)30498-9.

Banerjee, D., 2020. 'Age and ageism in COVID-19': elderly mental health-care vulnerabilities and needs. Asian J. Psychiatr. 51, 102154. https://doi.org/10.1016/j.ajp.2020.102154.

Basrak, N., Mulcrone, N., Sharifuddin, S., Ghumman, Z., Bechan, N., Mohamed, E., Murray, M., Rajendran, H., Gunnigle, S., Nolan, M., Quane, T., Terao, M., Hoare, T., Kirrane, K., Kennedy, H.G., Davoren, M., 2021. Risk of adverse outcome of COVID-19 among patients in secure psychiatric services: observational cohort study. BJPsych. Open 7. https://doi.org/10.1192/bjo.2020.169.

Bavel, J.J.V., Baicker, K., Boggio, P.S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A.J., Douglas, K.M., Druckman, J.N., Drury, J., Dube, O., Ellemers, N., Finkel, E.J., Fowler, J.H., Gelfand, M., Han, S., Haslam, S.A., Jetten, J., Kitayama, S., Mobbs, D., Napper, L.E., Packer, D.J., Pennycook, G., Peters, E., Petty, R.E., Rand, D. G., Reicher, S.D., Schnall, S., Shariff, A., Skitka, L.J., Smith, S., Sunstein, C.R., Tabri, N., Tucker, J.A., van der Linden, S., Lange, P. van, Weeden, K.A., Wohl, M.J. A., Zaki, J., Zion, S.R., Willer, R., 2020. Using social and behavioural science to support COVID-19 pandemic response. Nat. Hum. Behav. 4, 460–471. https://doi.org/10.1038/s41562-020-0884-z.

Buckwalter, W., Peterson, A., 2020. Public attitudes toward allocating scarce resources in the COVID-19 pandemic. PLoS One 15, e0240651. https://doi.org/10.1371/journal.pone.0240651.

Byrd, N., Białek, M., 2021. Your health vs. my liberty: philosophical beliefs dominated reflection and identifiable victim effects when predicting public health recommendation compliance during the COVID-19 pandemic. Cognition 212, 104649. https://doi.org/10.1016/j.cognition.2021.104649.

Canadian Medical Association, 2020. Framework for Ethical Decision Making during the Coronavirus Pandemic.

CDC, 2020. When vaccine is limited, who should get vaccinated first? CDC Your Health. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations.html.

Chaimowitz, G.A., Upfold, C., Géa, L.P., Qureshi, A., Moulden, H.M., Mamak, M., Bradford, J.M.W., 2021. Stigmatization of psychiatric and justice-involved populations during the COVID-19 pandemic. Prog. Neuro-Psychopharmacol. Biol. Psychiatry 106, 110150. https://doi.org/10.1016/j.pnpbp.2020.110150.

Cohn-Schwartz, E., Ayalon, L., 2021. Societal views of older adults as vulnerable and a burden to society during the COVID-19 outbreak: results from an Israeli nationally representative sample. J. Gerontol. B Psychol. Sci. Soc. Sci. 76, e313–e317. https://doi.org/10.1093/geronb/gbaa150.

Department of Health & Social Care, UK, 2021. Joint Committee on Vaccination and Immunisation: Advice on Priority Groups for COVID-19 Vaccination, vol. 30. December 2020.

Dos Santos, M.J., Martins, M.S., Santana, F.L.P., Furtado, M.C.S.P.C., Miname, F.C.B.R., Pimentel, R.R. da S., Brito, Á.N., Schneider, P., Dos Santos, E.S., da Silva, L.H., 2020. COVID-19: instruments for the allocation of mechanical ventilators-a narrative review. Crit. Care 24, 582. https://doi.org/10.1186/s13054-020-03298-3.

Dryhurst, S., Schneider, C.R., Kerr, J., Freeman, A.L.J., Recchia, G., Bles, A.M. van der, Spiegelhalter, D., van der Linden, S., 2020. Risk perceptions of COVID-19 around the world. J. Risk Res. 23, 994–1006. https://doi.org/10.1080/13669877.2020.1758193.

Emanuel, E.J., Persad, G., Upshur, R., Thome, B., Parker, M., Glickman, A., Zhang, C., Boyle, C., Smith, M., Phillips, J.P., 2020. Fair allocation of scarce medical resources in the time of covid-19. N. Engl. J. Med. 382, 2049–2055. https://doi.org/10.1056/NEJMsb2005114.

Eno Louden, J., Vaudreuil, E., Queen, C., Alvarez, M.E., Garcia, A., 2021. Flattening the curve in jails and prisons: factors underlying support for COVID-19 mitigation

policies. Psychol. Publ. Pol. Law 27, 124–139. https://doi.org/10.1037/law0000284.

Fan, W., Yan, Z., 2010. Factors affecting response rates of the web survey: a systematic review. Comput. Hum. Behav. 26, 132–139. https://doi.org/10.1016/j.chb.2009.10.015.

Favreau, M., Hillert, A., Osen, B., Gärtner, T., Hunatschek, S., Riese, M., Hewera, K., Voderholzer, U., 2021. Psychological consequences and differential impact of the COVID-19 pandemic in patients with mental disorders. Psychiatr. Res. 302, 114045. https://doi.org/10.1016/j.psychres.2021.114045.

Fiorillo, A., Gorwood, P., 2020. The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. Eur. Psychiatr. 63, e32. https://doi.org/10.1192/j.eurpsy.2020.35.

Gesser-Edelsburg, A., Cohen, R., Hijazi, R., Abed Elhadi Shahbari, N., 2020. Analysis of public perception of the Israeli government's early emergency instructions regarding COVID-19: online survey study. J. Med. Internet Res. 22, e19370 https://doi.org/10.2196/19370.

Government of Canada, 2020. COVID-19 Snapshot Monitoring (COSMO Canada), Wave 7 Results | Impact. Canada.

Government of Canada, 2017. Census profile, 2016 census - Canada. URL. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=01&Geo2=&Code2=&SearchText=Canada&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0.

Government of Ontario, 2020. Getting a COVID-19 Vaccine in Ontario. COVID-19 (Coronavirus) in Ontario. https://covid-19.ontario.ca/getting-covid-19-vaccine-ontario.

Han, S., Koch, V., 2020. Allocate Ventilators, Other Covid-19 Resources Based on Evidence, Not Political Hunches. STAT News. https://www.statnews.com/2020/03/17/allocate-ventilators-other-covid-19-resources-based-on-evidence/.

Johnson, K., Raymond, T., 2021. Federal Inmates Set to Receive COVID-19 Vaccines Starting Friday. CTV News. https://ottawa.ctvnews.ca/federal-inmates-set-to-receive-covid-19-vaccines-starting-friday-1.5254733.

Kennedy, H.G., Mohan, D., Davoren, M., 2020. Forensic psychiatry and Covid-19: accelerating transformation in forensic psychiatry. Ir. J. Psychol. Med. 1–9. https://doi.org/10.1017/ipm.2020.58.

King, D.B., O'Rourke, N., 2014. Social media recruitment and online data collection: a beginner's guide and best practices for accessing low-prevalence and hard-to-reach populations. Canadian Psychology/Psychologie canadienne 55, 240–249. https://doi.org/10.1037/a0038087.

Kinner, S.A., Young, J.T., Snow, K., Southalan, L., Lopez-Acuña, D., Ferreira-Borges, C., O'Moore, É., 2020. Prisons and custodial settings are part of a comprehensive response to COVID-19. Lancet Public Health 5, e188–e189. https://doi.org/10.1016/S2468-2667(20)30058-X.

Lehdonvirta, V., Oksanen, A., Räsänen, P., Blank, G., 2021. Social media, web, and panel surveys: using non-probability samples in social and policy research. Pol. Internet 13, 134–155. https://doi.org/10.1002/poi3.238.

Logie, C.H., Turan, J.M., 2020. How do we balance tensions between COVID-19 public health responses and stigma mitigation? Learning from HIV research. AIDS Behav 1–4. https://doi.org/10.1007/s10461-020-02856-8.

Maripuu, M., Bendix, M., Öhlund, L., Widerström, M., Werneke, U., 2021. Death associated with coronavirus (COVID-19) infection in individuals with severe mental disorders in Sweden during the early months of the outbreak—an exploratory cross-sectional analysis of a population-based register study. Front. Psychiatr. 11 https://doi.org/10.3389/fpsyt.2020.609579.

Maycock, M., 2021. 'Covid-19 has caused a dramatic change to prison life'. Analysing the impacts of the Covid-19 pandemic on the pains of imprisonment in the Scottish Prison Estate. Br. J. Criminol. azab031. https://doi.org/10.1093/bjc/azab031.

McClung, N., 2020. The advisory committee on immunization practices' ethical principles for allocating initial supplies of COVID-19 vaccine — United States, 2020. MMWR Morb. Mortal. Wkly. Rep. 69 https://doi.org/10.15585/mmwr.mm6947e3.

Mitchell, S.M., La Rosa, N.L., Cary, J., Sparks, S., 2021. Considering the impact of COVID-19 on suicide risk among individuals in prison and during reentry. J. Crim. Psychol. 11, 240–253. https://doi.org/10.1108/jcp-10-2020-0044.

Oladeru, O.T., Tran, N.-T., Al-Rousan, T., Williams, B., Zaller, N., 2020. A Call to Protect Patients, Correctional Staff and Healthcare Professionals in Jails and Prisons during the COVID-19 Pandemic, vol. 8. https://doi.org/10.1186/s40352-020-00119-1. Health Justice.

Parsons Leigh, J., Fiest, K., Brundin-Mather, R., Plotnikoff, K., Soo, A., Sypes, E.E., Whalen-Browne, L., Ahmed, S.B., Burns, K.E.A., Fox-Robichaud, A., Kupsch, S., Longmore, S., Murthy, S., Niven, D.J., Rochwerg, B., Stelfox, H.T., 2020. A national cross-sectional survey of public perceptions of the COVID-19 pandemic: self-reported beliefs, knowledge, and behaviors. PLoS One 15, e0241259. https://doi.org/10.1371/journal.pone.0241259.

Piscitello, G.M., Kapania, E.M., Miller, W.D., Rojas, J.C., Siegler, M., Parker, W.F., 2020. Variation in ventilator allocation guidelines by US state during the coronavirus disease 2019 pandemic. JAMA Netw. Open 3. https://doi.org/10.1001/jamanetworkopen.2020.12606.

Public Health Agency of Canada, 2020. Coronavirus disease (COVID-19): Outbreak update. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html#a1.

Quittkat, H.L., Düsing, R., Holtmann, F.-J., Buhlmann, U., Svaldi, J., Vocks, S., 2020. Perceived impact of covid-19 across different mental disorders: a study on disorder-specific symptoms, psychosocial stress and behavior. Front. Psychol. 11, 586246. https://doi.org/10.3389/fpsyg.2020.586246.

Rapisarda, S.S., Byrne, J., Marmolejo, L., 2020. An examination of COVID-19 outbreaks in prisons and jails in North America, Central America, and the caribbean. Vict. Offenders 15, 1234–1243. https://doi.org/10.1080/15564886.2020.1835766.

Salimi, A., ElHawary, H., Diab, N., Smith, L., 2020. The North American Layman's understanding of COVID-19: are we doing enough? Front. Public Health 8, 358. https://doi.org/10.3389/fpubh.2020.00358.

Sandoiu, A., 2020. Allocating Ventilators during COVID-19: what Is "Fair"? Medical News Today. https://www.medicalnewstoday.com/articles/allocating-ventilators-during-covid-19-what-is-fair.

Shaver, L.G., Khawer, A., Yi, Y., Aubrey-Bassler, K., Etchegary, H., Roebothan, B., Asghari, S., Wang, P.P., 2019. Using Facebook advertising to recruit representative samples: feasibility assessment of a cross-sectional survey. J. Med. Internet Res. 21 https://doi.org/10.2196/14021.

Simpson, A.I.F., Chatterjee, S., Darby, P., Jones, R.M., Maheandiran, M., Penney, S.R., Saccoccio, T., Stergiopoulos, V., Wilkie, T., 2020. Management of COVID-19 response in a secure forensic mental health setting. Can. J. Psychiatr. 65, 695–700. https://doi.org/10.1177/0706743720935648.

Singh, P., Cumberland, W.G., Ugarte, D., Bruckner, T.-A., Young, S.D., 2020. Association between generalized anxiety disorder scores and online activity among US adults during the COVID-19 pandemic: cross-sectional analysis. J. Med. Internet Res. 22, e21490 https://doi.org/10.2196/21490.

Siva, N., 2020. Experts call to include prisons in COVID-19 vaccine plans. Lancet 396, 1870. https://doi.org/10.1016/S0140-6736(20)32663-5.

Stanley-Becker, I., 2021. Early Vaccination in Prisons, a Public Health Priority, Proves Politically Charged. The Washington Post. https://www.washingtonpost.com/health/2021/01/02/covid-vaccine-prisons/.

Swift, H.J., Chasteen, A.L., 2021. Ageism in the time of COVID-19. Group Process. Intergr. Relat. 24, 246–252. https://doi.org/10.1177/1368430220983452.

Taylor, S., Landry, C.A., Rachor, G.S., Paluszek, M.M., Asmundson, G.J.G., 2020. Fear and avoidance of healthcare workers: an important, under-recognized form of stigmatization during the COVID-19 pandemic. J. Anxiety Disord. 75, 102289. https://doi.org/10.1016/j.janxdis.2020.102289.

Tomczyk, S., Rahn, M., Schmidt, S., 2020. Social distancing and stigma: association between compliance with behavioral recommendations, risk perception, and stigmatizing attitudes during the COVID-19 outbreak. Front. Psychol. 11 https://doi.org/10.3389/fpsyg.2020.01821.

UCLA, 2020. COVID-19 behind bars data project. UCLA law COVID-19 behind bars. URL. https://uclacovidbehindbars.org/.

United States Census Bureau, 2019. U.S. Census Bureau QuickFacts: United States. https://www.census.gov/quickfacts/fact/table/US/PST045219.

Vahia, V.N., Shah, A.B., 2020. COVID-19 pandemic and mental health care of older adults in India. Int. Psychogeriatr. 32, 1125–1127. https://doi.org/10.1017/S1041610220001441.

Wang, Q., Xu, R., Volkow, N.D., 2021. Increased risk of COVID-19 infection and mortality in people with mental disorders: analysis from electronic health records in the United States. World Psychiatr. 20, 124–130. https://doi.org/10.1002/wps.20806.

White, D.B., Lo, B., 2020. A framework for rationing ventilators and critical care beds during the COVID-19 pandemic. JAMA 323, 1773–1774. https://doi.org/10.1001/jama.2020.5046.

WHO, 2020a. Director-General's Opening Remarks at the Media Briefing on COVID-19 - 11 March 2020. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020.

WHO, 2020b. Ethics and COVID-19: Resource Allocation and Priority-Setting (No. WHO/RFH/20.2).

Yao, H., Chen, J.-H., Xu, Y.-F., 2020. Patients with mental health disorders in the COVID-19 epidemic. Lancet Psychiatr. 7, e21. https://doi.org/10.1016/S2215-0366(20)30090-0.