



## Barriers and facilitators to COVID-19 vaccine acceptability among people incarcerated in Canadian federal prisons: A qualitative study



David Lessard<sup>a,b</sup>, David Ortiz-Paredes<sup>a</sup>, Hyejin Park<sup>a</sup>, Olivia Varsaneux<sup>c</sup>, James Worthington<sup>c</sup>, Nicole E. Basta<sup>d</sup>, Shannon E. MacDonald<sup>e,f</sup>, Bertrand Lebouché<sup>a,b,g,h</sup>, Joseph Cox<sup>a,d,h</sup>, Shainoor J. Ismail<sup>i</sup>, Nadine Kronfli<sup>a,d,h,\*</sup>

<sup>a</sup> Centre for Outcomes Research and Evaluation, Research Institute of the McGill University Health Centre, Canada

<sup>b</sup> Canadian Institutes of Health Research Strategy for Patient-Oriented Research Mentorship Chair in Innovative Clinical Trial in HIV, Research Institute of the McGill University Health Centre, Canada

<sup>c</sup> Correctional Service Canada (CSC), Canada

<sup>d</sup> Department of Epidemiology, Biostatistics and Occupational Health, School of Population and Global Health, McGill University, Canada

<sup>e</sup> Faculty of Nursing, University of Alberta, Canada

<sup>f</sup> School of Public Health, University of Alberta, Canada

<sup>g</sup> Department of Family Medicine, McGill University, Canada

<sup>h</sup> Department of Medicine, Division of Infectious Diseases and Chronic Viral Illness Service, McGill University Health Centre, Canada

<sup>i</sup> Division of Immunization Programs and Pandemic Preparedness, Centre for Immunization and Respiratory Infectious Diseases, Public Health Agency of Canada and Metro City Medical Clinic, Canada

### ARTICLE INFO

#### Article history:

Received 14 August 2021

Received in revised form 24 January 2022

Accepted 16 February 2022

Available online 19 February 2022

### ABSTRACT

**Introduction:** Canadian correctional institutions have been prioritized for COVID-19 vaccination given the multiple outbreaks that have occurred since the start of the pandemic. Given historically low vaccine uptake, we aimed to explore barriers and facilitators to COVID-19 vaccination acceptability among people incarcerated in federal prisons.

**Methods:** Three federal prisons in Quebec, Ontario, and British Columbia (Canada) were chosen based on previously low influenza vaccine uptake among those incarcerated. Using a qualitative design, semi-structured interviews were conducted with a diverse sample (gender, age, and ethnicity) of incarcerated people. An inductive-deductive analysis of audio-recorded interview transcripts was conducted to identify and categorize barriers and facilitators within the Theoretical Domains Framework (TDF).

**Results:** From March 22–29, 2021, a total of 15 participants (n = 5 per site; n = 5 women; median age = 43 years) were interviewed, including five First Nations people and six people from other minority groups. Eleven (73%) expressed a desire to receive a COVID-19 vaccine, including two who previously refused influenza vaccination. We identified five thematic barriers across three TDF domains: social influences (receiving strict recommendations, believing in conspiracies to harm), beliefs about consequences (believing that infection control measures will not be fully lifted, concerns with vaccine-related side effects), and knowledge (lack of vaccine-specific information), and eight thematic facilitators across five TDF domains: environmental context and resources (perceiving correctional employees as sources of outbreaks, perceiving challenges to prevention measures), social influences (receiving recommendations from trusted individuals), beliefs about consequences (seeking individual and collective protection, believing in a collective “return to normal”, believing in individual privileges), knowledge (reassurance about vaccine outcomes), and emotions (having experienced COVID-19-related stress).

**Conclusions:** Lack of information and misinformation were important barriers to COVID-19 vaccine acceptability among people incarcerated in Canadian federal prisons. This suggests that educational interventions, delivered by trusted health care providers, may improve COVID-19 vaccine uptake going forward.

© 2022 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

\* Corresponding author at: 1001 Decarie Boulevard, D02.4110, Montreal, Quebec H4A 3J1, Canada.

E-mail address: [nadine.kronfli@mcgill.ca](mailto:nadine.kronfli@mcgill.ca) (N. Kronfli).

## 1. Introduction

During the first wave of the SARS-CoV-2 pandemic in Canada, an average of 30,000 adults were incarcerated in federal and provincial/territorial custody each day [1]. It is well recognized that prisons are high-risk settings for the transmission of infectious diseases due to challenges in screening and contact tracing [2], health communication [3], physical distancing, and the implementation of effective infection prevention and control measures [4]. Consequently, there have been concerning COVID-19 outbreaks in correctional settings worldwide [5], including in Canada [6-8]. Given the disproportionate incarceration of people experiencing social and health inequities, COVID-19 mortality rates in correctional institutions have been found to be several-fold higher than surrounding communities [5,9]. Furthermore, ethnocultural minority groups have been severely impacted by COVID-19 [10], many of whom are disproportionately incarcerated [1,11,12]. Several measures have been implemented to prevent the introduction and spread of SARS-CoV-2 in Canadian correctional facilities including decarceration, the restrictions of visitors, the cessation of inter-institutional transfers and staff cross-deployment, testing and contact tracing, and the introduction of mandatory quarantines upon admission [1,5]. Despite these measures, SARS-CoV-2 outbreaks have continued to occur, underscoring the importance of COVID-19 vaccination in correctional facilities.

In December 2020, the Canadian National Advisory Committee on Immunization prioritized “resident and staff of congregate settings”, such as correctional facilities, for early COVID-19 vaccination [13]. Despite the availability and promotion of routine vaccination in many correctional settings since the 1990s, vaccine uptake rates have remained historically low [14]. For example, influenza vaccination rates of people incarcerated in federal prisons on any given day between January and March 2021 ranged from 35 to 40% [15], with similarly low vaccine rates (36–46%) observed in the United States and the Australian criminal justice systems in previous years [3,14]. COVID-19 vaccine uptake in correctional institutions needs to reach much higher levels in order to mitigate the potential morbidity and mortality that COVID-19 outbreaks can cause [16].

According to the “5Cs” model, vaccine acceptability is influenced by confidence (trust in vaccine efficacy and safety, and in the system that delivers it), constraints (structural and psychological barriers), complacency (when a vaccine-preventable disease is not perceived as high risk), calculation (engagement in extensive information searching), and collective responsibility (a willingness to protect others) [17]. When applied to the Canadian correctional system, in the context of an aging and comorbid incarcerated Canadian population [16], and where resources and the infrastructure exist for vaccine delivery [18], “constraints” are unlikely to play a major role in vaccine acceptability. Conversely, confidence and complacency, which are largely driven by knowledge and attitudes, and calculation and collective responsibility, may influence vaccine acceptability. In prison settings, several factors may influence a lack of confidence including medical mistrust due to systemic inequities and negative perceptions or experiences with the response of the health services sector vis-à-vis infection control measures [19-22]. A lack of confidence can compromise information-seeking, further exacerbating vaccine uptake [23,24]. Barriers and facilitators to COVID-19 vaccine acceptability among incarcerated populations have not yet been fully explored in the Canadian context. We thus aimed to explore determinants of COVID-19 vaccine acceptability among people incarcerated in the Canadian federal correctional system.

## 2. Methods

### 2.1. Study design and participants

We conducted a qualitative study in March 2021 with adults (18 years of age and older) incarcerated in one of three federal correctional facilities, where people with sentences of two years or more are housed. In order to participate, individuals had to provide verbal consent in English or French. Those who had previously received a COVID-19 vaccine (first available to highest-risk inmates on January 8, 2021) were excluded; these individuals represent approximately 5% of the incarcerated federal population [25]. The sites were chosen in consultation with Correctional Service Canada (CSC) and represented the sites with historically low influenza vaccine uptake. Participants were recruited from Matsqui Institution (MI; British Columbia), Grand Valley Institution for Women (GVIW; Ontario), and Federal Training Centre (FTC; Quebec). MI houses 313 men in minimum- and medium-security. Over one-third (112; 36%) are Indigenous and one-fifth (65; 20%) are from diverse minority groups (Asian, Black, Hispanic, and other). GVIW houses 169 incarcerated women in minimum-, medium-, and maximum-security levels. Approximately one-third (53; 31%) are Indigenous and one-quarter (42; 25%) are from other minority groups. FTC is made up of a minimum-security wing, and a ‘multi’ minimum- and medium-security wing with a total of 420 incarcerated men. Overall, less than one-fifth are Indigenous (70; 17%) or from other minority groups (57; 14%). Both GVIW (March/April 2020) and FTC (April/May 2020 for the multi wing, and January/February 2021 for the minimum-security wing) were sites of prior COVID-19 outbreaks; eight and 163 individuals tested positive, respectively. One person died of COVID-19 at FTC.

In order to reflect the population incarcerated at each site, quota sampling, a non-probability, flexible sampling approach that ensures representation of key groups by recruiting a minimum number of participants presenting with specific characteristics [26], was used to select participants. More specifically, we used age (<35, 35–44, 45–54, 55–64, ≥65 years), ethnicity (Caucasian, Indigenous (First Nations, Inuit, and Metis), Asian, Black, Hispanic, and other), and security level (minimum, medium, and maximum) as criteria for quota sampling. The study was approved by the McGill University Health Centre Research Ethics Board (REB # 2021-7547).

### 2.2. Theoretical framework

This study was informed by the Theoretical Domains Framework (TDF). The TDF includes 14 domains to explain how individuals’, communities’, or populations’ decisions are shaped by past and present experiences, resources, and restrictions. These domains are categorized into three constructs: capability (knowledge, skills, behaviour regulation, memory and attention, decision-making), opportunity (environmental context and resources, social influences), and motivation (goals, social/professional role/identity, beliefs about capabilities, beliefs about consequences, optimism, reinforcement, emotions) [27]. While the TDF provides a lens to examine possible cognitive, affective, social, and environmental influences, it does not explain or infer causality about the determinants of a given behaviour. Rather, these constructs are primarily used in exploratory qualitative research to identify barriers and facilitators key to the implementation of interventions in diverse contexts for behavioural changes [27-29].

### 2.3. Data collection

We conducted semi-structured interviews via telephone or online videoconferencing in French or English. Interviews were

approximately one hour in duration and were audio-recorded. The interview schedule included questions on socio-demographics (age, ethnocultural background, duration of incarceration) and open-ended questions on three different topics: 1) Experiences with health care services and vaccination in prison; 2) Knowledge, perceptions, and experience of COVID-19; and 3) Knowledge and perceptions of the COVID-19 vaccines, including perceived risks and benefits, concerns, and fears. The interview guide was developed using the Acceptability Matrix of the Ethics, Equity, Feasibility, and Acceptability (EEFA) Framework (Supplementary Material, Appendix A) [30]. This Framework outlines several scientific and programmatic factors that are considered important by decision-makers when evaluating immunization programs.

#### 2.4. Data analysis

Interview recordings were transcribed using the Dovetail application (<https://dovetailapp.com/>). Transcriptions were then revised and de-nominalized by HP (interviews in English) and DL (interviews in French). DL conducted an inductive-deductive thematic analysis of the transcriptions using the NVivo 12.0 software (Melbourne, Australia). DL inductively coded and categorized participants' answers to the three topics. To ensure reliability, this first codification was discussed with DOP, adjusted, and discussed with DOP, HJ, and NK. The content of each resulting code was then classified into barriers and facilitators to COVID-19 vaccine acceptability and categorized within TDF constructs. Results and interpretations were then discussed with co-authors.

### 3. Results

From March 22–29, 2021, a total of 15 participants (n = 5 per site; n = 5 women; median age = 43 years old) were interviewed, including five First Nations people and six people from other ethnocultural minority groups. Table 1 describes the baseline characteristics of the participants, including self-reported influenza vaccine uptake in prison (ever) and prior COVID-19 diagnosis. Only one participant had previously had COVID-19. Among the 15 participants, 11 (73%) expressed a desire to receive a COVID-19 vaccine, including two participants who had previously refused influenza vaccination. Among the four participants who mentioned not wanting a COVID-19 vaccine, all had previously refused influenza vaccination. Three belonged to an ethnocultural minority group. The thematic analysis identified a total of thirteen themes

**Table 1**  
Baseline characteristics of study participants.

Participant number	Age range	Self-reported ethnocultural background	Self-reported prior COVID-19 diagnosis	Self-reported uptake of influenza vaccine in prison (ever)	Expressed desire to receive the COVID-19 vaccine
1	45–54	First Nations	No	No*	Yes
2	35–44	White	No	Yes	Yes
3	45–54	Black	No	Yes	Yes
4	35–44	White	No	Yes	Yes
5	<35	First Nations	No	No	No
6	<35	Black	No	Yes	Yes
7	45–54	First Nations	No	Yes	Yes
8	55–64	White	No	Yes	Yes
9	35–44	First Nations	No	No*	No
10	<35	White	No	No	No
11	<35	Hispanic	No	No	Yes
12	55–64	Black	No	No	No
13	45–54	Inuit	No	No	Yes
14	45–54	Asian	Yes	Yes	Yes
15	45–54	First Nations	No	Yes	Yes

\* Participant reported never having been offered an influenza vaccine in prison.

related to barriers and facilitators to COVID-19 vaccine acceptability.

#### 3.1. Barriers to vaccine acceptability

Barriers to COVID-19 vaccine acceptability were distributed across three TDF domains – social influences, beliefs about consequences, and knowledge – encompassing five themes. Table 2 presents illustrative quotations for each theme.

##### 3.1.1. Social influences

###### a. Receiving strict recommendations

Participants mentioned that they were less likely to follow health-related recommendations, including recommendations to receive a COVID-19 vaccine, if these recommendations were given in a strict or rigid manner and with no alternatives provided. While almost all participants reported believing they would be given the choice to accept or decline a COVID-19 vaccine, a few mentioned that they expected to be pressured if they expressed hesitancy, which made one participant more reluctant to agree to be vaccinated.

###### b. Believing in conspiracies to harm

Participants mentioned beliefs that the COVID-19 vaccines were part of a conspiracy to harm people. Participants were concerned that, because of a history of corruption, Canadian prisons could be the recipients of expired or harmful vaccines (e.g., associated with thromboembolic events, or ‘blood clots’) that were rejected by other countries or institutions. Another participant believed that the COVID-19 vaccines were created to reduce the world population, while others mentioned rumours that the vaccines were part of a conspiracy to ‘‘plant microchips’’ in people.

##### 3.1.2. Beliefs about consequences

###### a. Believing that infection prevention and control measures will not be fully lifted despite vaccination

Participants believed that, despite vaccination, infection prevention and control measures such as such as handwashing, sanitization of shared objects (e.g., coffee machines, door handles, telephones, etc.), wearing of personal protective equipment (e.g., masks), and physical distancing would not be fully lifted. Participants also questioned whether a ‘‘return to normal’’ would be possible following vaccination. These beliefs were motivated by the perception that the COVID-19 vaccines failed to prevent transmission and only served to prevent severe symptoms.

###### b. Being concerned with the risk of side effects or getting sick because of the vaccine

**Table 2**  
Illustrative quotations for barriers to COVID-19 vaccine acceptability.

Domain	Theme	Quotation (participant number)
Social influences	Receiving strict recommendations	<i>I probably wouldn't agree with [any health-related recommendation] if I was being told that was what was best for me. If somebody is being very strict or rigid about the way that those things are being communicated, then communication is huge. [...] I guess if [the COVID-19 vaccine] ever became mandatory, where people had to do it, that would then take away my power to choose. If that ever happened that would be a factor for not getting it. (5)</i>
	Believing in conspiracies to harm	<i>There's a tremendous pressure to accept the vaccine, coming from not only the staff and other inmates, but management as well, because they want to get everything back under normal functionality. I feel that we came to prison because we don't like people telling us what to do in the first place. So when you tell me to do something, my automatic reaction is to say no. (10)</i>
		<i>I know some countries did not want the type of vaccine that we're going to be getting as inmates. It's kind of alarming that it's not good enough for some countries, but it's okay for Canadian prison population. (4)</i>
Belief about consequences	Believing that infection prevention and control measures will not be fully lifted despite vaccination	<i>There are a lot of conspiracy theorists in here and they wouldn't even bother reading about [the COVID-19 vaccine]. They see it on the news and they go: 'Ah, that's just phony, the government is up to something and all the others are trying to inject us with some microchip or something.' It's ridiculous stuff that I hear in here. (8)</i>
		<i>[Other prisoners] said that [governments or authorities] were only giving [the COVID-19 vaccine] to kill people off, to reduce the population in the world. (9)</i> <i>The vaccine is not going to protect me a hundred percent, right? Why is it then I would take it if I would still have to be just as cautious as I am now about washing and distancing and wearing your masks, etcetera? (1)</i>
	Being concerned with risk of side effects or getting sick because of the vaccine	<i>[The COVID-19 vaccine] is not really for me. It's just not knowing whether we will be able to go into the population. Will we be free, like walking around without a mask on and talking and whatever else? Being sharing stuff with other people, playing cards and whatever else? It's kind of depressing. (9)</i>
		<i>Now that I'm contaminate-free, I'm more aware, I'm more balanced. I'm better out of drugs. [Concerning the COVID-19 vaccine], why play with fire? There's nothing wrong with me. So why fix something that ain't broken? (9)</i>
		<i>It was such a short testing period for the vaccine. So we don't really know if there will be side effects from the vaccine itself. These are my doubts about the vaccine. (7)</i>
Knowledge	Lacking information on the vaccine	<i>And I heard a lot of bad things about [the COVID-19 vaccine]. There are some side effects to certain kinds of vaccines and blood clots. Stuff like that really worries me and I know it worries other people too. (14)</i>
		<i>I worry that I'm going to get sick from [the COVID-19 vaccine]. They say the flu shot has formaldehyde in it. I don't know if formaldehyde is bad to be ingested in small amounts, but I know that we put formaldehyde in dead bodies. So why would I want it in my healthy body? The flu shot can make you sick. I don't know if that's being said about the COVID vaccine, but I wouldn't mind hearing about the reality and the truth of them. (4)</i>
		<i>[The information on the vaccine] is not disseminated. It's not packaged properly. And the way that things are in prisons, we hardly receive any information at all. [...] I still trust in the science and in public health, but my trust hasn't been waxed and waned a lot because of what's been going on. (10)</i>
		<i>If there were more facts and more information about where vaccines come from, what methods were used to deem them safe [...] and what kinds of people the vaccines were tested on, because people have different immune systems. I think everybody needs to be a little more educated about these things. [...] I'm just a little bit skeptic with regards to vaccines, especially if I don't have a high level of information about them. (5)</i>

All participants were concerned about possible COVID-19 vaccine-related side effects, including short-term discomfort, severe complications, or long-term vaccine-induced sequelae. The risk of severe side effects was identified as an important barrier for several participants who felt protected against severe COVID-19 or its related complications due to physical strength, a healthy lifestyle, religious faith, or having had a parent who survived a similar infection in the past. Participants expressed not wanting to receive the vaccine because they believed that the risk of side effects or complications exceeded the vaccine's individual protective benefits. Participants were reluctant to accept a COVID-19 vaccine because

they were concerned it may contain toxic elements present in influenza vaccines or parts of the SARS-CoV-2 virus, both of which could make them sick. For almost half of participants, concerns about the long-term complications were heightened by the perception that the COVID-19 vaccines were developed and distributed too quickly, potentially compromising the quality of the vaccines, the generalizability of clinical studies, and the overall knowledge of long-term complications (such as infertility). Participants from ethnocultural minority groups were also concerned that they were underrepresented in clinical trials and thus feared side effects that would have been underreported in clinical trials.

### 3.1.3. Knowledge

#### a. Lacking information on the vaccine

All participants reported existing COVID-19 vaccine information in prison as minimal, incomplete, or inadequately tailored to the needs of incarcerated people. Information regarding the COVID-19 vaccines was obtained from many sources including television, pamphlets, and conversations with or presentations by health care professionals. Despite this, several mentioned that the information was insufficient, and that this lack of information could contribute to vaccine hesitancy among incarcerated people. Participants identified a need for additional information vis-à-vis vaccine efficacy, side effects, and duration of protection. A few participants desired more information about the impact and management of SARS-CoV-2 outbreaks in prisons, and the expected effect of vaccination programs on the mitigation of outbreaks in correctional facilities. While additional information was desired, the majority of those who expressed not wanting the vaccine felt that more information would not change their decisions.

### 3.2. Facilitators to vaccine acceptability

Facilitators to COVID-19 vaccine acceptability were distributed across five domains – environmental context and resources, social influences, beliefs about consequences, knowledge, and emotions – encompassing eight themes. Table 3 presents illustrative quotations for each theme.

#### 3.2.1. Environmental context and resources

##### a. Perceiving correctional employees as the sources of COVID-19 outbreaks in prisons

While two-thirds of participants considered correctional settings to be low-to-moderate risk for COVID-19 outbreaks given their isolation from surrounding communities, all believed that correctional employees were the sources of these outbreaks given their daily movement in and out of prison. They considered vaccination a means to increase their sense of control in a situation where their perceived safety depended on the behaviours of others. The perception that their safety was contingent on others was associated with a heightened desire to protect themselves through vaccination.

##### b. Perceiving challenges related to prevention measures in prison

While all participants favoured the implementation of infection prevention and control measures, they underscored several environmental challenges that jeopardized their abilities to abide with preventive measures in prison. These include difficulties in complying with physical distancing and the lack of reliable protective equipment (e.g., masks, hand sanitizer). Participants also reported that the close physical proximity between people in prison, the constant sharing of objects (e.g., telephones, door handles) and spaces (e.g., cafeteria, bathrooms), and the disproportionate presence of people who may struggle to apply preventive measures (e.g., people with mental illness or who use drugs) reduced the benefits of the measures that were put in place. Consequent to these challenges, participants expressed feeling increasingly susceptible to SARS-CoV-2 in prison settings, fueling their desire to receive a COVID-19 vaccine.

#### 3.2.2. Social influences

##### a. Receiving recommendations from trusted individuals

Participants were more likely to follow health-related recommendations from health care professionals with whom they had had positive previous personal experiences, and who they perceived as trustworthy, having good interpersonal skills (e.g., supportive, non-judgmental, friendly, or attentive), and proactive (e.g., anticipating needs, solving problems). All participants

reported that they tried to follow recommendations, particularly if they were well-explained. Other participants mentioned family members as trusted individuals who influenced their decisions to follow health recommendations, including COVID-19 vaccination.

#### 3.2.3. Beliefs about consequences

##### a. Seeking both individual and collective protection against severe COVID-19

Participants described COVID-19 as a disease whose severity varied from asymptomatic or mild to fatal. Participants perceived severe disease to be associated with several risk factors including increased age, sedentary lifestyle, obesity, presence of chronic health conditions (e.g., asthma, diabetes), or a weak immune system due to a poor diet or drug use. Most participants mentioned high vaccine efficacy in preventing severe COVID-19 and its complications as a facilitator to vaccine acceptability. The desire to reduce the risk of severe symptoms, complications, or sequelae related to COVID-19 through vaccination was particularly prominent among participants who self-identified as high risk due to comorbidities associated with increased COVID-related morbidity and mortality. With respect to collective protection, the majority of participants wanted a COVID-19 vaccine to reduce the risk of transmission (and subsequent complications and sequelae) to others and to ensure ongoing access to health care services by preventing COVID-19-related hospitalizations.

##### b. Believing that COVID-19 vaccination will allow a collective “return to normal”

Participants believed that infection prevention and control measures, such as restricted visitations, would be at least partially lifted for all when a sufficient proportion of incarcerated people and correctional employees were vaccinated. This belief was an important facilitator to vaccine acceptability for all participants. A participant, who expressed not wanting the vaccine, stated that they would accept it if they could be assured that it would end restrictions. Some participants expressed that a higher proportion of people in prison would need to be vaccinated compared to the general population to lift infection prevention and control measures, with one hypothesizing that this proportion would need to be 100%.

##### c. Believing that there will be individual privileges for those who are vaccinated

Approximately one-third of participants believed that only those who were vaccinated would receive individual privileges. These included access to certain prison-specific services (e.g., family visits, shared housing) or activities following their release (e.g., housing at a halfway house, air travel, entering stores), which were restricted or withdrawn during the pandemic. For participants, this belief was an incentive to vaccination.

#### 3.2.4. Knowledge

##### a. Reassurance about vaccine outcomes

One-third of participants mentioned that witnessing the safe vaccination of others including family members and friends was reassuring and facilitated their decision to accept the vaccine. Similarly, seeing or hearing about good vaccine outcomes from peers, correctional employees, or family members who had received the vaccine, or equally, from the news, was a facilitator to vaccine acceptability. A participant stated that hearing about negative vaccine-related complications in the news could generate fear for some, but that a certain degree of side effects was expected given the millions of people who were being vaccinated around the world.

#### 3.2.5. Emotions

##### a. Having experienced COVID-19-related anxiety



**Table 3**  
Illustrative quotations for facilitators to COVID-19 vaccine acceptability.

Domain	Theme	Quotation (participant number)
Environmental context and resources	Perceiving correctional employees as the sources of COVID-19 outbreaks in prisons	<i>In this place, you got correctional staff and people that work here that are putting basically the inmates at risk because they leave the facility and they go home every day and live their lives. They're the reason that you can get the virus. So if we don't and they don't get vaccinated, then we would get a high risk of actually getting infected. (6)</i>  <i>[The COVID-19 vaccine] could be good for us because staff members who come to work, and they are more at risk of bringing [COVID-19] here. So if we are vaccinated and they come in with it, we are protected. (15)</i>
	Perceiving challenges related to prevention measures in prison	<i>Because it's such a close-knit community and there's no real social distancing. It's hard to socially distance when you live in the same living unit with somebody. [COVID-19] would catch like wildfire. [The vaccine] would stop me from getting it, and would stop you from spreading it. So it would minimize the COVID-19 infected population. (2)</i>  <i>We can try to socially distance, but there are certain places where we cannot keep our distances. When we are in our cells, we cannot stay two meters apart. [...] We share the same bathroom, the same shower. Even if we clean up after the other, there's always a risk. To eat, we are all in the same cafeteria and we touch the plates. [...] It is very important [that everybody in prison get vaccinated for COVID-19] because we are obliged to stick among ourselves. (11)</i>
Social influences	Receiving recommendations from trusted individuals	<i>Because they are considerate. They care about my actual health and they're just trying to give me a heads up. [...] What [else] made me follow the recommendation? Their expertise. [...] Being able to know what you're talking about. And to know what people are actually going through and what exactly is wrong with the person, instead of just giving them a bunch of other stuff that are not helpful at all. [...] I would say also being more familiar with the person. I would feel more comfortable. (6)</i>  <i>I think my psychologist could make me change my mind [about the COVID-19 vaccine]. That is the person I trust the most in the whole [correctional institutional]. If I have a discussion and I don't think she would do that, but if I raise any concern and she said 'Hey, don't do that', then it's definitely a no. (3)</i>
		<i>I think what made my decision [about the COVID-19 vaccine] is that I spoke to my family and we had many conversations regarding the pros and the cons and my age and the risk factors. So I think the main thing that really pushed me was the community support that I have. [...] I think what really swayed me is my family, you know, loving them and understanding more the risks. (3)</i>
Beliefs about consequences	Seeking both individual and collective protection against severe COVID-19	<i>The benefits are that you'll have a vaccine, and the vaccine will help you fight the COVID virus and it would probably save your life. [The possibility of being infected with COVID-19 despite receiving the vaccine] doesn't mean that it won't save your life. [...] Everybody should receive the vaccine. (14)</i>  <i>I feel that [getting the COVID-19 vaccine] is almost like my duty to do as a citizen. It's kind of like voting. It's just something I should do. We all have to kind of come together, like wearing a mask. (4)</i>
	Believing that vaccination will allow a collective "return to normal"	<i>If we don't take the vaccine, then [COVID-19] is pretty much going to be here all the time until we get a cure. It's scary. We can get so bad, we could run out of hospital space. [...] The benefits is not getting the COVID: I'm protecting myself as well as others, as it can stop me from being a carrier. I believe it's very important because it can protect them, especially those who are ill or elderly. (1)</i> <i>The more people that are vaccinated, the safer that, or the faster that this whole crisis is going to come to an end, then I might change my opinion a little bit, because if I can help things move along a little bit, then I might be more inclined to think about actually getting the vaccine. But again, like I want, I would need to know more about whether it actually is going to have a big impact [on restrictions]. (5)</i>  <i>It's a good thing that we finally have something for people to take, so everything can go back to normal. I would think that the benefits would be that after you get [the COVID-19 vaccine], that you would be basically somewhat immune to the virus and that you could basically start living a more regular lifestyle instead of being stuck quarantining, not being able to do what you were doing before. (6)</i>
	Believing that there will be individual privileges for those who are vaccinated	<i>I'm a prisoner, but I have children outside and I have grandchildren. I am looking forward to see them. And they have the right to have a father, you know? So I guess it's very important for people that are inside the prison and outside to get the vaccine. (14)</i> <i>I just feel like I won't be accepted to a halfway house. I won't be able to go to treatments without the vaccine. So moving forward with, in life and what's going on, I think that it's only smart to get [the COVID-19 vaccine]. (2)</i>  <i>It would be like a passport to say 'Okay, you know what? This is a green light.' I've been vaccinated, so that allows me to go here and allows me to go there, to be around my wife, maybe to go into certain stores or something like this. I don't know what they're going to do, but you know, if I have to take [the COVID-19 vaccine], I will take it. (7)</i>

Table 3 (continued)

Domain	Theme	Quotation (participant number)
Knowledge	Reassurance about vaccine outcomes	<i>We have to pay a flat rate to use the telephone. If instead of having to pay all this money out, we didn't have to pay our deduction. [...]. Because I know some people in here that say they don't want to be vaccinated, but I think that that would persuade them maybe to do it. I think that would be just a really great incentive. (4)</i>
		<i>Now that I'm starting to see people take, and the way that people are reacting to it, it's actually going to be better just to get it because it'd be safer instead of just taking the risk of catching the virus. So that's why I changed my mind. (6)</i>
Emotions	Having experienced COVID-19-related stress	<i>Some people had blood clots, if I'm not mistaken. From what we can see, comparatively, I think that at a moment, I heard that there were 24 cases in the world. Well, it's not a lot on the millions who got this vaccine. On the television or on the radio, it is good because they often explain and in that [newspaper title] there was page where they explain everything in detail. (15)</i>
		<i>If I'm offered the vaccine, I'll take it. Cause for my personal health issues, [COVID-19] is deadlier than a flu, so I'm going take the vaccine. Because [COVID-19] is a scary thing. (13)</i>
		<i>[Being vaccinated will allow us come] back to normal, for sure. I think we will have a decrease in our stress [...]. For sure, stress will decrease, as guys will feel they can go back to normal life. (11)</i>

Experiencing negative emotions like stress or fear related to the possibility of severe COVID-19 was a facilitator to vaccine acceptability. Being vaccinated was perceived by participants as a way to mitigate these emotions. Participants also associated infection prevention and control measures with negative emotions such as confusion, stress, irritability, and fear. It was felt that the lifting of these restrictive measures following the vaccination of a sufficient proportion of people living and working in prisons would allay these feelings.

#### 4. Discussion

This qualitative study explored barriers and facilitators to COVID-19 vaccine acceptability among people incarcerated in three Canadian federal correctional institutions. Our sample, selected through quota sampling, included a range of different perspectives from diverse backgrounds to represent the population concerned. Our analysis identified five barriers associated with three domains of the TDF framework (social influences, belief about consequences, and knowledge) and eight facilitators associated with five TDF domains (social influences, belief about consequences, knowledge, environmental context and resources, and emotions). Interestingly, these domains parallel those in a COVID-19 vaccine hesitancy study in the general Canadian population [31], suggesting that similar behaviours may be key to address in the implementation of interventions to improve vaccine uptake. We also found that, while intention to get vaccinated was high (73%), there are several prevailing concerns that could be addressed to both increase acceptability among those still resistant, and to provide additional resources (and enhance confidence) among those willing but requiring additional reassurance.

Studies have indicated that previous vaccination, in particular with the influenza vaccine, may be a facilitator to COVID-19 vaccine acceptability [32,33]. While this theme was not extracted from our interviews, all participants who had previously accepted influenza vaccination expressed a desire for COVID-19 vaccination, suggesting that previous influenza vaccination may indeed act as a facilitator. Conversely, half of participants who were offered the influenza vaccine and who subsequently declined it, expressed interest in a COVID-19 vaccine. This difference in attitude between the influenza and the COVID-19 vaccines may be explained by the fact that vaccine hesitancy is not fixed and may change with shifting contexts or when a vaccine and its related information are offered multiple times [34,35]. It is evident from our study that the measures put into place during the SARS-CoV-2 pandemic were

incomparable to those implemented during previous influenza seasons, and that these highly disruptive infection prevention and control measures altered the routine prison “context”, thereby potentially affecting vaccine acceptability.

According to our findings, COVID-19 vaccine acceptability in federal prisons is in part influenced by complacency. Complacency negatively affected vaccine acceptability for a minority of participants. These participants were predominantly below the age of 30 and self-described as “healthier” than their peers. In other words, participants who expressed not wanting a COVID-19 vaccine perceived themselves at relatively low risk of a severe SARS-CoV-2 infection. Other studies have confirmed similar findings; younger incarcerated people were less likely to accept a COVID-19 vaccine [33,34,36-39]. Conversely, older participants with comorbidities expressed a greater interest in vaccination, recognizing their heightened risk of severe disease.

Our results also highlight that COVID-19 vaccine acceptability in Canadian federal prisons may be largely driven by confidence. In fact, confidence acted both as a barrier and a facilitator to vaccine acceptability. Interestingly, as a barrier, this lack of confidence was not due to concerns regarding vaccine efficacy, but primarily due to safety – that is, potential side effects and long-term complications. Furthermore, these safety concerns exceeded the protective benefits of vaccination against severe COVID-19 for some. Studies exploring vaccine hesitancy have found that minority or disadvantaged groups disproportionately perceive vaccines as potentially harmful [40], and that these perceptions are associated with experiences of systemic racism and historical inequalities [20,21], a phenomenon that is reflected in our study. Half of the participants who expressed not wanting the vaccine were from minority groups, and others expressed concerns for a potentially disproportionate incidence of side effects and complications among women, people with mental health conditions, and other disadvantaged groups. Conversely, “receiving recommendations from trusted individuals” – that is, having trust in the system that delivers vaccines, emerged as an important thematic facilitator to COVID-19 vaccine acceptability, with health care providers identified as trustworthy sources of information. This finding is consistent with a recent study in a U.S. correctional setting that demonstrated that vaccine acceptance was associated with trust in medical professionals [33]. This study also highlighted the importance of trusted sources of COVID-19 information (e.g., television and family/friends) in influencing vaccine COVID-19 acceptance.

We also found that COVID-19 vaccine acceptability among participants incarcerated in federal prison was in large part driven by

a lack of information, thereby preventing engagement in extensive information searching (i.e. calculation). A lack of information, and moreover, tailored to the needs of those in prison, was an important theme that emerged from our study. Participants reported that COVID-19 vaccine information was insufficient and incomplete, and acknowledged that inadequate information could impact vaccine hesitancy. Previous studies in correctional facilities also demonstrated that people who fail to acknowledge the severity of the disease [39] or who have concerns regarding side effects and suboptimal vaccine efficacy [33] are more likely to decline COVID-19 vaccination. While providing adapted information will be key, addressing misinformation such as conspiracies to harm will be equally important as misinformation has been shown to be associated with reduced vaccination intent [41].

Complacency and confidence, as well as calculation, can be addressed with the provision of education. To varying degrees, all participants voiced skepticism and concerns regarding the COVID-19 vaccines, underscoring a need for additional and tailored information. Experts have argued that educational interventions will be key to reinforce trust in science-based interventions like vaccination [42,43], particularly as a result of the medical mistrust that emerged from disruptions caused by the COVID-19 pandemic. Furthermore, studies have confirmed that prison-based vaccination programs have the potential to increase vaccine uptake if partnered with education [44-46]. Based on our findings, to increase COVID-19 vaccine willingness, information regarding vaccine efficacy and effectiveness, short- and long-term side effects, and the implications of collective vaccination on the removal of restrictive measures could be explored. Nurses, as “trusted individuals”, could also be considered key to increasing COVID-19 vaccination rates in Canadian correctional settings. Finally, while the provision of education is an important first step, studies have shown only modest improvements in vaccine uptake with education [47,48], underscoring that education will likely need to be paired with other interventions to achieve increased uptake. While alternative strategies (e.g., other providers such as peers, media or content) could be developed simultaneously and tailored to the needs of incarcerated people who express vaccine hesitancy [49,50], building trust with those incarcerated will be critical moving forward [51].

Collective responsibility emerged as an important, yet previously undocumented theme, on vaccine acceptability in correctional settings. Participants expressed concerns for others' well-being, a desire to “end the crisis” through vaccination, and to protect each other by contributing to “herd immunity”. This willingness to protect others extended beyond the borders of participants' own prison walls; they demonstrated a desire to better understand pandemic management in correctional institutions other than their own. This collective responsibility may be explained by the stronger sense of community that may have emerged as a result of increased anxiety, fear, and a sense of vulnerability that those incarcerated may have experienced during the COVID-19 pandemic, potentially exacerbated by deepened social divisions and mistrust between those living and working in prison [52]. Educational programs should thus be complemented with efforts to safeguard trusting relationships between health care professionals and incarcerated people, recognizing that there may be a greater divide post-pandemic.

There are limitations to our study. Firstly, a limited number of participants were included. However, we achieved data saturation, and our sampling method succeeded in including a diverse sample representative of the incarcerated population at each site, thereby capturing a range of perspectives which may serve as the foundation for future work. Further, we believe our results are transferable to other correctional facilities with similar characteristics to our study sites. Secondly, as with all qualitative studies, volunteer,

sampling, and social desirability biases may have been introduced. While there are limitations, this study adds to the dearth of literature vis-à-vis COVID-19 vaccine hesitancy among people in prison [36]. By contrasting participants' lived experiences and highlighting patterns across their opinions, this study provides empirically-grounded evidence for our understanding of COVID-19 vaccine acceptability and hesitancy for incarcerated individuals.

In conclusion, we identified key barriers and facilitators to COVID-19 vaccine acceptability among people incarcerated in Canadian federal prisons. In particular, a lack of confidence and information will be key to address, and education about COVID-19 vaccines, delivered by trusted health care providers, may improve COVID-19 vaccine uptake in correctional settings going forward.

## Funding

This work was supported by a grant from the McGill Interdisciplinary Initiative in Infection and Immunity. NEB is supported by a Canada Research Chair (Tier 2) in Infectious Disease Prevention. BL holds a Canadian Institutes for Health Research, Strategy for Patient-Oriented Research Mentorship Chair in Innovative Clinical Trials for HIV Care and also supported by a career award, LE 250, from the Quebec's Ministry of Health for researchers in Family Medicine. NK is supported by a career award from the *Fonds de Recherche Québec – Santé (FRQ-S; Junior 1)*.

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: DL, DO-P, HP, OV, JW, NEB, SEM, and SJI have no conflicts of interest to declare. BL reports research funding from Gilead Sciences, Merck and ViiV Healthcare, advisory fees from Gilead Sciences, ViiV Healthcare, Merck, and speaker fees from Gilead Sciences, ViiV Healthcare and Merck. JC has research funding from ViiV Healthcare and Gilead Sciences, and reports remuneration for advisory work (ViiV Healthcare, Gilead Sciences and Merck Canada). NK reports research funding from Gilead Sciences, advisory fees from Gilead Sciences, ViiV Healthcare, Merck and Abbvie, and speaker fees from Gilead Sciences and Merck.

## Acknowledgements

We would like to thank the following individuals who assisted with recruitment: Monica Tan, Cindy Ritchie, and Josh Clarke at Matsqui Institution, Gabriela Torres, Denise Thompson, and Melanie Hutchinson at Grand Valley Institution for Women, and Bruno Telles, Nadège Hotila, Jasmine Champeau, Réjean Bérard, Fabienne Girard, and Christian Roy at Federal Training Centre. We would also like to thank Anu Gregory, Michelle Smith, and Lisa Krenus at Matsqui Institution, Susan Martin at Grand Valley Institution for Women, and Véronique Grégoire at Federal Training Centre.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jvacx.2022.100150>.

## References

- [1] Malakieh J. Adult and youth correctional statistics in Canada, 2018/2019. Juristat: Canadian Centre for Justice Statistics; 2020. p. 3–23.
- [2] Blair A, Parnia A, Siddiqi A. Testing lags and emerging COVID-19 outbreaks in federal penitentiaries: A view from Canada. medRxiv 2020. 2020.05.02.20086314.



- [3] Madeddu G, Vrolich H, Oordt-Speets A, Babudieri S, O'Moore É, Noordegraaf MV, et al. Vaccinations in prison settings: A systematic review to assess the situation in EU/EEA countries and in other high income countries. *Vaccine* 2019;37(35):4906–19.
- [4] Beaudry G, Zhong S, Whiting D, Javid B, Frater J, Fazel S. *Managing outbreaks of highly contagious diseases in prisons: a systematic review*. *BMJ Glob Health* 2020;5(11):e003201. <https://doi.org/10.1136/bmjgh-2020-003201>.
- [5] Kronfli N, Akiyama MJ. Prioritizing incarcerated populations for COVID-19 vaccination and vaccine trials. *EClinicalMedicine* 2021;31:100659. <https://doi.org/10.1016/j.eclinm.2020.100659>.
- [6] Correctional Service Canada. *Testing of inmates in federal correctional institutions for COVID-19*. 2021-01-06 [cited 2021 Jan 06]; Available from: <https://www.csc-ccc.gc.ca/001/006/001006-1014-fr.shtml>.
- [7] Gouvernement du Québec. *Nombre de cas dans les établissements de détention*. 2021-01-06 [cited 2021 Jan 06]; Available from: <https://www.quebec.ca/sante/problemes-de-sante/a-z/coronavirus-2019/situation-coronavirus-quebec/#c57309>.
- [8] Government of Canada. *Coronavirus disease 2019 (COVID-19): Epidemiology update*. 2021-01-06 [cited 2021 Jan 06]; Available from: <https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>.
- [9] Wang EA, Zenilman J, Brinkley-Rubinstein L. Ethical considerations for COVID-19 vaccine trials in correctional facilities. *JAMA* 2020;324(11):1031–2.
- [10] Strassle C, Jardas E, Ochoa J, Berkman BE, Danis M, Rid A, et al. Covid-19 vaccine trials and incarcerated people—The ethics of inclusion. *N Engl J Med* 2020;383(20):1897–9.
- [11] Nowotny KM, Kuptsevych-Timmer A. Health and justice: framing incarceration as a social determinant of health for Black men in the United States. *Sociology Compass* 2018;12(3). <https://doi.org/10.1111/soc4.v12.310.1111/soc4.12566>.
- [12] Singh D, Prowse S, Anderson M. Overincarceration of Indigenous people: a health crisis. *CMAJ* 2019;191(18):E487–8.
- [13] Government of Canada. *Preliminary guidance on key populations for early COVID-19 immunization*. 2020-11-03 [cited 2021 Jan 06]; Available from: <https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/guidance-key-populations-early-covid-19-immunization.html>.
- [14] Vicente-Alcalde N, Ruescas-Escolano E, Harboe ZB, Tuells J. Vaccination Coverage among Prisoners: A Systematic Review. *Int J Environ Res Public Health* 2020;17(20):7589. <https://doi.org/10.3390/ijerph17207589>.
- [15] Correctional Service Canada. *Flu Shot Coverage (unpublished data)*. 2020.
- [16] Office of the Correctional Investigator. *Aging and Dying in Prison: An Investigation into the Experiences of Older Individuals in Federal Custody*. 2019-02-28 [cited 2021 Jan 06]; Available from: <https://www.oci-bec.gc.ca/cnt/rpt/oth-aut/oth-aut20190228-eng.aspx%20Updated%20February%2028>.
- [17] Betsch C, Schmid P, Heinemeier D, Korn L, Holtmann C, Böhm R, et al. Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. *PLoS ONE* 2018;13(12):e0208601. <https://doi.org/10.1371/journal.pone.0208601>.  
<https://doi.org/10.1371/journal.pone.0208601.t001>.  
<https://doi.org/10.1371/journal.pone.0208601.t002>.  
<https://doi.org/10.1371/journal.pone.0208601.t003>.  
<https://doi.org/10.1371/journal.pone.0208601.t004>.  
<https://doi.org/10.1371/journal.pone.0208601.t005>.  
<https://doi.org/10.1371/journal.pone.0208601.t006>.  
<https://doi.org/10.1371/journal.pone.0208601.t007>.  
<https://doi.org/10.1371/journal.pone.0208601.t008>.  
<https://doi.org/10.1371/journal.pone.0208601.t009>.  
<https://doi.org/10.1371/journal.pone.0208601.t010>.  
<https://doi.org/10.1371/journal.pone.0208601.t011>.  
<https://doi.org/10.1371/journal.pone.0208601.t012>.  
<https://doi.org/10.1371/journal.pone.0208601.t013>.  
<https://doi.org/10.1371/journal.pone.0208601.t014>.  
<https://doi.org/10.1371/journal.pone.0208601.t015>.  
<https://doi.org/10.1371/journal.pone.0208601.t016>.  
<https://doi.org/10.1371/journal.pone.0208601.t017>.  
<https://doi.org/10.1371/journal.pone.0208601.t018>.  
<https://doi.org/10.1371/journal.pone.0208601.t019>.  
<https://doi.org/10.1371/journal.pone.0208601.t020>.
- [18] Canada, G.o. *Vaccination at federal correctional institutions*. 2021 May 12, 2021 [cited 2021 May 27]; Available from: <https://www.canada.ca/en/correctional-service/campaigns/covid-19/vaccine-csc.html>.
- [19] Momplaisir, F., et al., *Understanding Drivers of COVID-19 Vaccine Hesitancy Among Blacks*. Clinical infectious diseases : an official publication of the Infectious Diseases Society of America, 2021.
- [20] Bogart LM, Ojikutu BO, Tyagi K, Klein DJ, Mutchler MG, Dong Lu, et al. COVID-19 Related Medical Mistrust, Health Impacts, and Potential Vaccine Hesitancy Among Black Americans Living With HIV. *J AIDS Journal of Acquired Immune Deficiency Syndromes* 2021;86(2):200–7.
- [21] Mosby I, Swidrovich J. Medical experimentation and the roots of COVID-19 vaccine hesitancy among Indigenous Peoples in Canada. *CMAJ* 2021;193(11):E381–3.
- [22] Edwards B, Biddle N, Gray M, Sollis K, Di Gennaro F. COVID-19 vaccine hesitancy and resistance: Correlates in a nationally representative longitudinal survey of the Australian population. *PLoS ONE* 2021;16(3):e0248892. <https://doi.org/10.1371/journal.pone.0248892>.  
<https://doi.org/10.1371/journal.pone.0248892.t001>.  
<https://doi.org/10.1371/journal.pone.0248892.t002>.  
<https://doi.org/10.1371/journal.pone.0248892.t003>.  
<https://doi.org/10.1371/journal.pone.0248892.t004>.  
<https://doi.org/10.1371/journal.pone.0248892.t005>.
- [23] Murphy J, Vallières F, Bentall RP, Shevlin M, McBride O, Hartman TK, et al. *Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom*. *Nat Commun* 2021;12(1). <https://doi.org/10.1038/s41467-020-20226-9>.
- [24] Lazarus JV, Ratzan SC, Palayew A, Gostin LO, Larson HJ, Rabin K, et al. A global survey of potential acceptance of a COVID-19 vaccine. *Nat Med* 2021;27(2):225–8.
- [25] Correctional Service Canada. *Older Offenders in Federal Custody: Overall Trends*. Government of Canada 2019 2019-08-27 [cited 2022 January 24]; Available from: <https://www.csc-ccc.gc.ca/research/rib-19-03-en.shtml>.
- [26] Robinson OC. Sampling in Interview-Based Qualitative Research: A Theoretical and Practical Guide. *Qualitative Research in Psychology* 2014;11(1):25–41.
- [27] Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science* 2012;7(1):37.
- [28] Atkins L, Francis J, Islam R, O'Connor D, Patey A, Ivers N, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation Science* 2017;12(1). <https://doi.org/10.1186/s13012-017-0605-9>.
- [29] Nilsen P. Making sense of implementation theories, models and frameworks. *Implementation Science* 2015;10(1):53.
- [30] Ismail SJ, Hardy K, Tunis MC, Young K, Sicard N, Quach C. A framework for the systematic consideration of ethics, equity, feasibility, and acceptability in vaccine program recommendations. *Vaccine* 2020;38(36):5861–76.
- [31] Griffith J, Marani H, Monkman H. COVID-19 Vaccine Hesitancy in Canada: Content Analysis of Tweets Using the Theoretical Domains Framework. *Journal of medical Internet research* 2021;23(4):e26874. <https://doi.org/10.2196/26874>.
- [32] Crawshaw, J., et al. *Factors affecting COVID-19 vaccination acceptance and uptake among the general public: a living behavioural science evidence synthesis*. 2021 April 30, 2021 [cited 2021 May 27]; Available from: [https://www.mcmasterforum.org/docs/default-source/product-documents/living-evidence-syntheses/covid-19-living-evidence-synthesis-4.1-factors-affecting-covid-19-vaccination-acceptance-and-uptake-among-the-general-public.pdf?sfvrsn=5368712f\\_7](https://www.mcmasterforum.org/docs/default-source/product-documents/living-evidence-syntheses/covid-19-living-evidence-synthesis-4.1-factors-affecting-covid-19-vaccination-acceptance-and-uptake-among-the-general-public.pdf?sfvrsn=5368712f_7).
- [33] Liu YE et al. Factors associated with COVID-19 vaccine acceptance and hesitancy among residents of Northern California jails. *medRxiv* 2021. 2021.11.22.21266559.
- [34] Chin ET, Leidner D, Ryckman T, Liu YE, Prince L, Alarid-Escudero F, et al. Covid-19 Vaccine Acceptance in California State Prisons. *N Engl J Med* 2021;385(4):374–6.
- [35] SteelFisher GK, Blendon RJ, Caporello H. An Uncertain Public – Encouraging Acceptance of Covid-19 Vaccines. *N Engl J Med* 2021;384(16):1483–7.
- [36] Geana MV, Anderson S, Ramaswamy M. COVID-19 vaccine hesitancy among women leaving jails: A qualitative study. *Public Health Nurs* 2021;38(5):892–6.
- [37] Stern MF, Piasecki AM, Strick LB, Rajeshwar P, Tyagi E, Dolovich S, et al. Willingness to Receive a COVID-19 Vaccination Among Incarcerated or Detained Persons in Correctional and Detention Facilities – Four States, September–December 2020. *MMWR Morb. Mortal. Wkly. Rep.* 2021;70(13):473–7.
- [38] Fisher KA, Bloomstone SJ, Walder J, Crawford S, Fouayzi H, Mazor KM. Attitudes Toward a Potential SARS-CoV-2 Vaccine : A Survey of U.S Adults. *Ann Intern Med* 2020;173(12):964–73.
- [39] Di Giuseppe G, Pelullo CP, Lanzano R, Napolitano F, Pavia M. Knowledge, attitudes, and behavior of incarcerated people regarding COVID-19 and related vaccination: a survey in Italy. *Sci Rep* 2022;12(1). <https://doi.org/10.1038/s41598-022-04919-3>.
- [40] Razaï, M.S., et al. *Covid-19 vaccine hesitancy among ethnic minority groups*. *BMJ*, 2021. **372**, DOI: 10.1136/bmj.n513.
- [41] Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nat Hum Behav* 2021;5(3):337–48.
- [42] Dawson A, Emanuel EJ, Parker M, Smith MJ, Voo TC. Key Ethical Concepts and Their Application to COVID-19 Research. *Public Health Ethics* 2020;13(2):127–32.
- [43] Rutjens BT, van der Linden S, van der Lee R. Science skepticism in times of COVID-19. *Group Processes & Intergroup Relations* 2021;24(2):276–83.
- [44] Buck JM, Morrow KM, Margolis A, Eldridge G, Sosman J, MacGowan R, et al. Hepatitis B Vaccination in Prison: The Perspectives of Formerly Incarcerated Men. *Journal of Correctional Health Care* 2006;12(1):12–23.
- [45] Devine A, Karvelas M, Sundarajan V. Evaluation of a prison-based hepatitis B immunisation pilot project. *Aust N Z J Public Health* 2007;31(2):127–30.
- [46] Winter RJ, White B, Kinner SA, Stooevé M, Guy R, Hellard ME. A nurse-led intervention improved blood-borne virus testing and vaccination in Victorian prisons. *Aust N Z J Public Health* 2016;40(6):592–4.
- [47] Piedimonte S, Leung A, Zakhari A, Giordano C, Tellier P-P, Lau S. *Impact of an HPV Education and Vaccination Campaign among Canadian University Students*. *Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynécologie du Canada : JOGC* 2018;40(4):440–6.
- [48] Yu H, Qian L, C. Yaping *Evaluation of two health education interventions to improve the varicella vaccination: a randomized controlled trial from a province in the east China*. *BMC Public Health* 2018;18:144. <https://doi.org/10.1186/s12889-018-5070-0>.
- [49] Cataldi JR, Kerns ME, O'Leary ST. Evidence-based strategies to increase vaccination uptake: a review. *Curr Opin Pediatr* 2020;32(1):151–9.
- [50] Paul E, Steptoe A, Fancourt D. Attitudes towards vaccines and intention to vaccinate against COVID-19: Implications for public health communications. *Lancet Reg Health Eur* 2021;1:100012.
- [51] Gagnon, D. and É. Dubé. *Literature Review on Effective Strategies to Improve Vaccine Acceptance and Uptake*. 2019 [cited 2021 July 2]; Available from: [https://canvax.ca/sites/default/files/2019-02/Literature%20Review%20on%20Effective%20Strategies%20to%20Improve%20VAU\\_3.pdf](https://canvax.ca/sites/default/files/2019-02/Literature%20Review%20on%20Effective%20Strategies%20to%20Improve%20VAU_3.pdf).
- [52] Shoham E. *Prison tattoos : a study of Russian inmates in Israel*. Cham: Springer; 2015.