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Barriers and Enablers of COVID-19 Vaccination Among Black, Eastern European, and Low Socioeconomic Status Communities in Canada

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Abstract

Background

The COVID-19 pandemic exacerbated existing health inequities in Canada and globally. Vaccination remains a key protective behaviour, but some population groups have lower uptake. We aimed to identify factors that influence COVID-19 vaccine uptake in three groups prioritised by local public health officials in Ontario, Canada.

Methods

We partnered with local public health units and community members from prioritised communities (Black, Eastern European, and neighbourhoods with low uptake) to investigate population-specific barriers and enablers of COVID-19 vaccine uptake using behavioural science. Interviews in English, French, Arabic, Ukrainian, Russian, and Polish (with interpreters/translators) explored factors influencing COVID-19 vaccination (first dose and first booster dose). The Theoretical Domains Framework guided data collection and analysis.

Results

We interviewed 68 participants (78% female; *M*age = 35–42 years, range = 19–75 years) across three groups, with diverse self-identified races and ethnicities. Half (52%) had received two doses and 25% had received one or zero. Many expressed hesitancy or fear regarding COVID-19 vaccines. Social influences was a prominent domain. Six themes of barriers and enablers were identified: 1) knowledge, resources and skills to access vaccine; 2) salient experiences with vaccines or infection; 3) personal risk assessment; 4) trust versus mistrust in health systems; 5) interplay between vaccine mandates and intention; and 6) memory and attention.

Conclusions

Findings illustrate barriers and enablers for specific populations with low vaccine uptake. Context-specific, community-driven trust-building efforts remain essential for improving uptake. Further work should elucidate the behavioural, social and environmental determinants of vaccination among underserved populations and communities across global diasporas.

Background

Behavioural science approaches can contribute to reducing inequities in the delivery of healthcare services and resources by identifying evidence-based mechanisms of change which are most relevant to specific groups or populations. In so doing, behavioural science can help inform the design and

implementation of effective public health policies and programs[1–3]. In some jurisdictions, policymakers and public health organisations drew from behavioural science during the COVID-19 pandemic, when people worldwide were asked – and needed – to change their behaviour many times and in many ways, in a rapidly shifting context steeped in uncertainty.[4,5]

Though the COVID-19 pandemic is no longer a public health emergency, the virus continues to pose a significant risk to individual health, including serious health complications from long COVID[6]. The pandemic exposed and exacerbated existing social and health inequities on a global scale[7,8], including disparities in morbidity and mortality documented among population groups in Canada[9–11]. Data show that racial, socioeconomic, and ethnic minorities were disproportionately affected by COVID-19[8,12–15], which has been attributed to systemic inequalities including poverty and overrepresentation in frontline, 'essential' jobs[7,8]. Vaccines, including booster doses, remain the best protection against COVID-19 variants[16]. While uptake of COVID-19 vaccines was over 80% of the Canadian population as of June 2024 for at least one dose, vaccine coverage has declined greatly since the pandemic[17]. Racial, ethnic, and geographic disparities in vaccine uptake necessitates interventions tailored for specific communities.[4,18–20]

In Canada and other countries, vaccine acceptance has been lower among some racial and ethnic minorities compared to the general population[19,21,22]. Systematic reviews have shown that vaccine acceptance was lowest among Black people in the US[23], and in Canada, acceptance was lower in non-White (21.7%) compared to White individuals (14.8%)[24]. The 2021 Canadian Community Health Survey (N = 64,722) reported that 56.4% of Black people were willing to get vaccinated compared to 77.7% and 82.5% for White and South Asian people, respectively[19]. Non-vaccination rates were highest in off-reserve First Nations and Black people and lowest in South Asian people.[19]

Research from Canada and elsewhere has identified barriers to COVID-19 vaccination commonly reported by ethnic minority groups and newcomers (i.e., recent immigrants) related to information needs, access, concerns about vaccine safety, and mistrust[13,25–27]. A review of 34 studies found that influences on vaccine acceptance in marginalized groups were related to the domains of knowledge, environmental context and resources, and social influences[13]. In contrast, a review of 175 studies among the general population identified concerns about vaccine safety, mistrust, and gaps in knowledge about vaccines as the most prominent barriers to COVID-19 vaccine acceptance, and that these barriers were more pronounced in some racialized groups (e.g., Black, Latinx) compared to others (e.g., White, Asian)[13]. These findings demonstrate how a one-size-fits-all approach to COVID-19 vaccine promotion is insufficient to promote health equity for all – a longstanding conclusion in behavioural science research.[28]

Within health psychology and beyond, theories applied to vaccination and other pro-social health behaviours highlight the interplay of cognitive, social, and structural determinants of uptake. The Health

Belief Model, Protection Motivation Theory, and the Theory of Planned Behavior emphasize perceived risk, benefits, barriers, and self-efficacy as core predictors of preventive action[29–31], while Social Cognitive Theory situates these decisions within social learning processes and underscores the role of self-efficacy[32]. Implementation and diffusion frameworks further show how contextual fit, communication pathways, and system-level factors shape the translation of intention into action[33,34]. Research during COVID-19 demonstrates that institutional trust, discrimination, and historical medical abuses substantially influence vaccine confidence among marginalized groups[35,36]. The Theoretical Domains Framework (TDF, v2) provides an integrative lens for organising these multilevel influences by linking beliefs, norms, and structural barriers across domains such as *Social influences, Beliefs about consequences, and Environmental context and resources*[37,38]. The COM-B model conceptualises vaccination behaviour as arising from interactions between Capability, Opportunity, and Motivation, with the TDF translating these components into theoretical domains that can be systematically mapped onto evidence-based behaviour change techniques to inform intervention design.[37–39]

The investigation of the breadth of influences (barriers and enablers) on vaccine uptake across diverse population groups is helped by using a broad theoretical framework. The TDF is an integrative, theory-based framework widely used in behavioural and implementation science to identify influences on behaviour[37,38]. It synthesizes constructs from 33 behaviour-change theories into 14 theoretical domains (*Knowledge*, *Skills, Social/professional role and identity, Beliefs about capabilities, Optimism, Beliefs about consequences*, *Reinforcement, Intentions, Goals, Memory, attention and decision processes, Environmental context and resources, Social influences, Emotion*, and *Behavioural regulation*) representing key cognitive, social and environmental barriers and enablers of behaviour. Identified TDF domains can then be used to inform intervention developments processes[40]. By including domains such as *Environmental context and resources, Social/professional role and identity*, and *Social influences*, the TDF taps into access issues, social norms, mistrust and other systemic factors which are critical to address in contexts of social inequity, diversity, and structural barriers.[41]

The OPTimise project (the “OPTimise Platform”) was developed as a flexible platform to support public health units (PHUs) in applying behavioural science strategies tailored to their evolving priorities and existing efforts. Partnerships were formed with PHUs, community leaders, and residents across three large urban centres in Ontario, Canada: Ottawa, Toronto, and the region of Peel (Mississauga, Brampton, and Caledon).

The OPTimise Platform aims to identify what drives individuals to engage in specific health behaviours, such as vaccination. This understanding informs public health strategies to promote behaviour uptake that reflect the realities of priority groups in each setting, including historically excluded and equity-denied populations. We aimed to identify barriers and enablers (TDF) influencing acceptance and uptake of the first and/or first booster dose of the COVID-19 vaccine in three priority groups to inform and complement local public health promotion of COVID-19 vaccination for each priority group.

Method

This study was reported according to the Standards for Reporting Qualitative Research[42]. For detailed descriptions of PHU prioritization and community engagement processes, see Fontaine and Smith et al. (2024).[43]

Prioritising Populations and COVID-19 Protective Behaviours

In January 2022, we used a prioritization matrix with PHUs to determine a COVID-19 protective behaviour and a priority group in their local jurisdiction (see Supplementary Material 1 in Fontaine and Smith et al., 2024)[43]. Considerations discussed with PHUs during the prioritization process included population density, demographics, health status, political and economic structures, healthcare systems and resource access. All chose uptake of COVID-19 vaccination in groups with low uptake. We also asked PHUs to select a specific dose in the vaccine series of most interest, given that individuals' behavioural drivers may differ at each stage of vaccination. The Ottawa PHU prioritised the first booster dose in adults residing in five low socioeconomic status neighbourhoods, the Peel Region PHU prioritised the first dose in adults in Eastern European communities, and the Toronto PHU prioritised the first dose in adults from Black communities residing in five neighbourhoods.

Community Advisory Groups

Community advisory groups were formed, comprised of members of the priority groups (community advisors). We worked with local organizations to connect with people who may be interested. The role of community advisory groups was to provide guidance and support across stages of the research process such as participant recruitment, data collection and analysis, dissemination of recommendations.

Six to eight community advisors joined each community advisory group. TL, JP, MS, and GF met monthly with the Ottawa and Toronto community advisory groups from August 2022 to February 2023. TL and EG met monthly with the Peel Region community advisory group from June to August 2023 (shorter period due to time-intensive community advisory group recruitment). Community advisors received an honorarium of $75 CAD per meeting.

Fontaine and Smith et al (2024)[43] report further details of our community engagement process and Porchak et al (2025)[44] report an arm's length evaluation of our community engagement.

Participant Recruitment

Participants self-identified as aged 18 + years and members of a priority group. Purposive sampling aimed to include at least 75% of individuals per group who had not received a first dose or booster dose.

Members of community advisory groups referred participants from their communities aided by translated information sheets. Snowball sampling was also used. We drew upon the 10 + 3 decision rule[45] to inform our sampling, with 15–20 initial interviews (depending on community advisory group referrals), followed by two to three more interviews, until theoretical saturation. Participants were provided with a $50 CAD gift card.

Interviews

We conducted semi-structured interviews between September 2022 and August 2023 using a 16-question interview guide (see Supplementary Material). Interviews explored barriers and enablers based on the Theoretical Domains Framework to getting the first or first booster dose of the COVID-19 vaccine. For clarity and cultural sensitivity, interview guides were tailored and piloted with community advisors in one-on-one meetings with a member of the research team (TL, EG). Consultation with community advisory groups and review of local census data determined a need to recruit language experts to support interviews beyond English (i.e., French and Arabic in Ottawa and Ukrainian, Russian and Polish in Peel Region). Participants chose to be interviewed online (video call; with camera off option) or by phone. To mitigate existing mistrust in health systems which extended to our research team, we worked closely with community advisors and operationalized intersectionality and reflexivity in the recruitment and interview process.[46]

Informed consent

was obtained prior to data collection. English interviews were conducted by TL, EG, and KT, French interviews by GF and JP, Arabic interviews by AA, Ukrainian and Russian interviews with an interpreter, KZ, and a Polish interview with a professionally contracted interpreter. Interviews were audio-recorded and professionally translated and transcribed if in a language other than English or French. Interviewer notes were sent to participants for validation[47]. Minor iterations were made to improve the interview guide throughout data collection in consultation with community advisory groups and the methods subgroup.

Data Analysis

Iterative thematic analysis was conducted deductively and inductively to characterise and contextualize barriers and enablers within each domain[38] and to develop overarching themes. Given the public health emergency of the pandemic and the needs of our public health partners, we aimed to accelerate the analysis. When coders were fluent in the interview language (i.e., English, French, Arabic), we coded from recordings and interviewer notes. When coders were not fluent (i.e., Eastern European languages), we had interpretation/translation done as close to real time as possible and coded notes/transcriptions rapidly. First, raw notes were coded deductively to domains from the TDF. Then, themes related to barriers and enablers for each group were extracted inductively from raw notes, with the corresponding

TDF domains providing additional insights and organization. Our team determined that there were similarities and differences across the three groups that facilitated extraction of overarching themes, allowing parallel presentation. Original and single coding of 50% of interview data was done by TL. Fifty percent of interview data (recordings, notes, and coding) was double coded by TL, AA (fluent in Arabic), KT, GF (fluent in French), MW, EG, GM and ZVA. Agreement improved over time and discrepancies were discussed to achieve consensus. During and after analysis, anonymized findings were presented to all community advisory groups using themes and fictionalized representative personas. We asked community advisory groups for their feedback, such as whether our results converged with experiences of their communities or if we were missing or misinterpreting data. Throughout the process, we produced short documents titled “What We Heard/What We Did” to summarize feedback and explain what could be integrated and what could not and why (see Supplementary Material 1 in Fontaine and Smith et al., 2024).[43]

Results

Sample Characteristics

In total, 68 participants (61–88% female, mean age = 35–42 years, age range = 19–75) across three priority groups (n = 21–25) were interviewed from October 2022 to August 2023 (Table 1). Racial and ethnic representation varied as a function of the group, and participants self-identified across 21 different racial or ethnic backgrounds. Half reported one or more previous COVID-19 infections and half reported receiving two doses of the COVID-19 vaccine. Interviews lasted an average of 42 minutes, and most were in English (76%).

Table 1

Sample characteristics for each priority group.

Demographics	**Ottawa**	**Peel Region**	**Toronto**
Number of participants	22	21	25
Mean age (years)	42	39	35
Age range (years)	19–75	19–70	19–66
Gender			
Male	4	8	3
Female	18	13	22
Racial or ethnic self-identification			
Black/African	6	0	11
Arab/Middle Eastern	12	0	0
Caribbean/Afro-Caribbean	0	0	14
Indigenous Canadian	1	0	0
Ukrainian	0	15	0
European/White	3	6	0
Newcomer (Peel Region only)		13	
Doses of COVID-19 vaccine received			
0	0	6	8
1	0	1	2
2	15	9	12
3	5	5	3
4+	2		0
Previous COVID-19 infection (confirmed or suspected)			
Once	8	9	9
Twice	4	0	4
Three times	0	1	0
Never	9	11	12
Unsure	1	0	0

Demographics	Ottawa	Peel Region	Toronto
Interview dates (month/year)	10/22 to 11/22	3/23 to 8/23	11/22 to 1/23
Interview mode			
Zoom	19	5	0
Phone	3	16	25
Mean interview length (minutes)	39	49	39
Interview length range (minutes)	22–71	32–77	20–84
Interview language			
English	10	17	25
French	4	0	0
Arabic	8	-	-
Ukrainian	-	3	-
Polish	-	1	-

Themes

Themes, subthemes, sample quotes and TDF domains are presented in Table 2. Barriers and enablers were synthesized into six overarching themes present for each priority group: 1) knowledge, resources and skills to access vaccine, 2) salient personal experiences with vaccines or infection, 3) personal risk assessment, 4) trust versus mistrust in health systems, 5) interplay between vaccine mandates and intention, and 6) memory and attention. Not all subthemes were present for each priority group as depicted in Table 2. We identified 11 TDF domains (*Knowledge; Skills; Social/professional role and identity; Beliefs about consequences; Reinforcement; Intention; Goals; Memory, attention and decision processes; Environmental context and resources; Social influences; Emotion*) related to barriers and enablers to uptake of COVID-19 vaccine across the three priority groups. Domains are highlighted in this paper with italics and parentheses adjacent to relevant findings.

Table 2
Themes, subthemes, quotes and TDF domains for barriers and enablers of COVID-19 vaccine uptake in three low-uptake groups.

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
Knowledge about vaccines (Enabler) / Gaps in knowledge about vaccines (Barrier)	Knowledge	✓	✓	✓	"Boosters help to protect. They don't prevent, they protect. With the variants of COVID, we need more levels of protection." - T2 "I don't see the importance of third dose because people continue to get COVID-19." - O4
Access issues (e.g., lack of time, transportation, childcare) (Barrier) / Close/convenient clinic locations (Enabler)	Environmental context and resources	✓	✓	✓	"I don't have a car, I have to spend the whole day.. . Whole logistics of transportation, it puts people in some stress." - P6 "They can bring them [third doses] to my community, and we will do it. I sent my kids to get their first two to the one here. It's good if you don't have to take the bus. It's almost $3.50." - T7
Navigating access to healthcare system (e.g., language) (Barrier)	Skills	✓	✓		"Because I'm an immigrant, I don't know the health system very well." - O6
Theme 2: Salient Personal Experiences with Vaccines or Infection					

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
Positive experiences with COVID vaccine and other vaccines (Enabler)	Reinforcement	✓			"I didn't get any side effects after the first two which motivated me to get the third." - O1
Negative experiences with COVID-19 vaccine and other vaccines (Barrier)	Reinforcement	✓	✓	✓	"It [first dose] wasn't easy. My arm was swollen, it still has a lump in it. I regret taking it. I had to wait in line." - T13
Witnessing or experiencing COVID-19 infection and symptoms (Enabler)	Reinforcement	✓	✓	✓	"When my father was sick [with COVID-19] it was hard. So, then we have a conversation with family and we should decision [sic], "ok we should get third vaccine"." - P12 "I wasn't going to get it at first.. . The turning point was when my friend told me about how sick she was and it scared me. It made it reality, it was no longer just numbers on the TV, I knew someone in the number." - T25
Theme 3: Personal Risk Assessment					
Perceived high risk/fear of COVID-19 infection (Enabler) / Belief that COVID-19 is not/no longer a serious risk (Barrier)	Beliefs about consequences, Emotion	✓	✓	✓	"It was getting scary, people were dying, we didn't have an option." - T20 "Nobody is dying anymore." - T24

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
Identifies as strong/healthy therefore vaccination is unnecessary (Barrier)	Social/professional role and identity	✓	✓	✓	"In Africa, we were born with lots of different diseases like malaria, so COVID, it was like nothing. I've had sicknesses where I didn't know if I would make it. Our bodies are very strong, African people." - O17
Belief that natural remedies/healthy lifestyle and other protective measures are more effective (Barrier)	Beliefs about consequences, Social/professional role and identity		✓	✓	"Growing up, medicine was not a huge part of our lives.. . My mom is huge on ginger, garlic, supplementing your health to make you be stronger.. . I saw firsthand that Western medicine is not always the answer.. . So, my approach has never been pills or hospital. It's been rest and apples." - P14
Theme 4: Trust Versus Mistrust in Health Systems					
Positive social influences (Enabler)	Social influences	✓		✓	"Work with community partners.. . This would get much higher turnaround and response from people. They're coming to us and engaging, not just sitting in a pavilion and waiting for us to come to them. A community partner is a familiar face at

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
					your door, not just a stranger.” - O8
Negative social influences (Barrier)	Social influences	✓	✓	✓	“In the summer I went home to Turkey, they have a more anti-vax mindset, people there, than in Canada. It does impact us, we follow these countries, it’s part of the immigrant mindset. We can’t get away from extended family and their difficulties, and opinions. It somehow almost informs our thinking, like living in two countries at the same time.” - O3
Concerns about vaccine development, side-effects, and adverse reactions (Barrier)	Beliefs about consequences, Emotion	✓	✓	✓	"I’m scared to get sick from the vaccine, or have heart problems." - P11
Misinformation and rumours (Barrier)	Social influences, Knowledge, Beliefs about consequences	✓	✓	✓	"Let's say for vaccines, people were just injected saline, and the actual product [COVID vaccine] was sold somewhere else. Anything like that, I don't know if it's true or not." - P4
Trust in public health authorities/science (Enabler) / Mistrust in public health/government authorities (Barrier)	Social influences	✓	✓	✓	"And we’re trusting science.. . I trust people who are educated. Trust is a major thing when it comes to this. Trust in that the vaccination

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
					will help in some way." - T10 "There is no trust in the government because of corruption in Eastern Europe. There is always that element that people from there bring to the Western world. They judge other governments based on that." - P4
Religious leader influence/Faith will protect against COVID-19 (Barrier)	Social influences, Social/professional role and identity		✓	✓	“Pastors are telling people not to take it.. . I only trust God. God will protect me." - T24
Discussed COVID-19 vaccine with primary care provider (Barrier or Enabler)	Social influences, Environmental context and resources	✓	✓	✓	"Even my primary doctor told me that I am in the age group that should take the vaccination, so that is why I got it." - P19 “I talk to my family doctor. I said you have my history, is it OK to take the first two? For the third I asked, he said if you want to. It's a different answer, before he told me yes. I think even he thinks I don’t need it.” - T7
Concerns about history of anti-Black racism in medicine/government (Barrier)	Social influences, Reinforcement	✓		✓	“In the Black community, generally speaking, it’s different when it comes to healthcare.

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
					There's more of an uneasiness.. . More Black people die from one of the cancers for example, prostate, I think. This data just keeps coming out, so why would we believe anything that is being pushed towards us?" - T6
Theme 5: Interplay Between Vaccine Mandates and Intention					
Got vaccinated due to mandates (Enabler)	Reinforcement, Goals	✓	✓	✓	"For me it's not for health, I'm very skeptical, it's expected for my life, like travelling, use public places, that's why I make vaccine. It's not about health." - P16
Strong intentions to not get vaccinated (Barrier)	Intention		✓	✓	"I want to go back to school to pursue my career.. . but I had to drop the course because it required the third dose. I would rather drop the course than take the third dose." - T18
Feeling forced to take first two doses due to government mandates (Barrier)	Emotion	✓		✓	"I think I do have somewhat of a choice but mostly it's up to our employers. I wouldn't have ever gotten it if they didn't make me. They stripped our choice away." - T6

Themes and Subthemes (Barriers, Enablers)	Key TDF Domain(s)	Ottawa	Peel Region	Toronto	Sample Quotes
Theme 1: Knowledge, Resources and Skills to Access Vaccine					
Desire to protect self/others (Enabler)	Goals, Social/professional role and identity	✓	✓	✓	"In work, I deal with a lot of people, so I felt that I need to take the third dose to stay healthy.. . Also, my family is a priority that is why I try my best to stay healthy as much as possible to take care of them." - O18
Theme 6: Memory and Attention					
Not reached by promotion or talk of third dose (Barrier)	Memory, attention, and decision processes, Environmental context and resources	✓		✓	“It needs to be out there more, I haven’t seen it enough. I go out every day, I haven’t seen a poster or an ad on my phone.” - O13
Not thinking about or paying attention to COVID-19 or COVID-19 vaccines (Barrier)	Memory, attention, and decision processes, Intention		✓	✓	"In Ukraine, COVID stopped when war started. It's not in people’s mind." - P5
Reminders/prompts (Enabler)	Memory, attention, and decision processes	✓			"I got a text from [pharmacy] saying I could get it [third dose], even now." - O15

Table 2. *Themes, subthemes, quotes and TDF domains for barriers and enablers of COVID-19 vaccine uptake in three low-uptake groups.*

[Insert Table 2]

Theme 1: Knowledge, Resources and Skills to Access Vaccine

In each group, some were aware that COVID-19 vaccines provide protection against severe illness but did not prevention infection. While some were aware why there is a need for booster doses (*Knowledge*),

most thought that vaccines were intended to prevent infection and/or expressed confusion about why booster doses are recommended (*Knowledge*). Many stated that the first two doses provide enough protection, therefore boosters are not needed. Several in Ottawa and Toronto were unaware of common adverse events following immunization that may occur (e.g., fatigue, arm soreness), which led to negative experiences when the individual did not expect side effects or understand why they occurred (*Reinforcement*).

Participants across groups described barriers to accessing vaccines, such as lack of time due to work, childcare, and cost of public transportation (*Environmental context and resources*). Those who had received one or two doses often compared current access-related challenges to the relative ease of access earlier on in the pandemic, at conveniently located pop-up clinics and pharmacies (*Environmental context and resources*). A few participants in Ottawa and Peel Region described additional barriers faced by people who are new to Canada (e.g., immigrants, refugees) related to navigating a foreign healthcare system and/or language (*Skills*).

Theme 2: Salient Personal Experiences with Vaccines or Infection

A barrier often emphasized in all groups was negative experiences with COVID-19 and other vaccines (e.g., influenza), primarily due to unexpected soreness near the vaccination location and minor flu-like symptoms (*Reinforcement, Knowledge*). However, a few participants cited experiencing no side effects from the first two doses as a positive experience which facilitated their willingness to receive a first booster dose (*Reinforcement*). One Toronto participant directly attributed her positive experience with COVID-19 vaccines to a nurse who explained the side effects and suggested vaccination in the non-dominant arm (*Reinforcement*).

A belief shared by many participants across groups was that because they or someone they knew got infected with COVID-19 after they received COVID-19 vaccines, the vaccines must not be effective (*Knowledge*). In other words, participants drew the conclusion that the vaccine cannot be effective at all if it does not prevent infection.

In each group, a few participants recounted powerful narratives of how their views about the COVID-19 vaccine completely changed after they or a close friend or family member got infected with COVID-19. Their decision to get vaccinated was prompted by the realization of how severe COVID-19 symptoms can be, and in some cases, by witnessing how the vaccine reduced symptom severity (*Knowledge, Reinforcement*).

Theme 3: Personal Risk Assessment

Participants generally perceived their personal risk of severe illness or infection due to COVID-19 to be low. The sentiment that COVID-19 is no longer (or as expressed by some, never was) a serious health risk was a very common barrier for participants in all groups (*Beliefs about consequences*), particularly for booster doses. Participants minimized the seriousness of infection and compared COVID-19 to

influenza, which they believed also posed a low risk. Several Ottawa participants said that a potential enabler for them to get a first booster dose would be an increased risk of infection or serious illness from COVID-19 (*Beliefs about consequences*). Relatedly, in each group, the perception of oneself as strong or healthy and therefore not at risk was a common barrier to vaccinations. Participants frequently referenced age (both youth and seniors), current good health, a strong immune system, and a healthy lifestyle as reasons for not receiving the first or a booster dose (*Social/professional role and identity*).

In Peel Region and Toronto, several participants detailed how their personal and cultural beliefs in holistic health practices (e.g., healthy diet, vitamins and supplements) and natural remedies (e.g., teas, medicinal herbs) are incongruent with Western medicine including vaccines (*Beliefs about consequences, Social/professional role and identity*). Many linked this belief to formative experiences in their familial countries of origin (e.g., Jamaica, Poland) where they learned they learned to value traditional medicine. In both groups, some participants expressed the belief that vaccines weaken the body or immune system either permanently or temporarily, and natural remedies build strength and immunity.

Theme 4: Trust Versus Mistrust in Health Systems

Trust and lack of trust were the most influential factors related to COVID-19 vaccination across all groups, cutting across multiple TDF domains, but especially *Social influences*. Trust and mistrust in government and health systems was prominent: most participants described mistrust in these institutions and in the scientific process, with the exception of those who had received three or more doses, who generally expressed greater trust (*Reinforcement*). In Peel Region, several newcomers linked their mistrust to experiences of government corruption in their countries of origin, while in Toronto participants attributed mistrust to systemic anti-Black racism and historic medical abuses, including forced sterilization and the Tuskegee syphilis experiment [48]. In Ottawa, one participant similarly traced their mistrust to systemic anti-Indigenous racism and mentioned the Sixties Scoop [49] (*Social influences, Reinforcement*). Trust in the vaccines themselves was identified as an enabler by at least one participant in Ottawa and Toronto, but not in Peel Region. Overall, mistrust in the vaccines was more common in Toronto and Peel Region than in Ottawa, where the priority dose number was highest (i.e., three total). Race- and age-based concerns, including rumours that the vaccine was designed to harm Black or older people, were shared by many Toronto participants (*Social influences, Knowledge, Beliefs about consequences*). Finally, religious sources of mistrust, including beliefs in healing or protection by a higher power and negative messaging from faith leaders in Christianity and Islam also influenced participants in Peel Region and Toronto to not receive a COVID-19 vaccine (*Social influences, Social/professional role and identity*).

Barriers related to social influences which negatively influenced vaccination such as from family, friends, neighbours, coworkers, and social media were discussed by most participants. Some participants who had immigrated from other countries specifically noted negative influences from contacts based in their country of origin. Many participants in all groups and particularly in Toronto described varying degrees of tension in interpersonal relationships due to conflicting vaccination choices, some involved family

separation. They frequently shared stories and rumours about people who had adverse reactions to and fatalities from COVID-19 vaccines that contained elements of misinformation (*Social influences, Beliefs about consequences, Knowledge*). The stories were usually heard from others or seen on social media (e.g., YouTube). Such stories were a major barrier for many participants, who expressed strong fears of experiencing the same adverse effects (*Beliefs about consequences, Emotion*). Common concerns about rumoured side effects were infertility and heart-related conditions. Overall, participants who expressed health concerns as a barrier to vaccination appeared to focus more on perceived susceptibility and severity of vaccine side effects than potential risks associated with COVID-19 infection and symptoms.

Positive social influences encouraged vaccination uptake for a few participants in Ottawa and Toronto. Participants described discussing vaccination with and feeling encouraged by family members, coworkers, and most commonly, their primary care physicians, who were helpful in answering questions and explaining how COVID-19 vaccines work (*Social influences, Environmental context and resources, Knowledge*). For the first booster dose, physician attitudes were described as a potential barrier to vaccination by some participants in Ottawa and Toronto who reported concluding that the first booster dose was not important or necessary for them based on perceived ambivalence from their physician.

Theme 5: Interplay Between Vaccine Mandates and Intention

In all groups, previously enacted government mandates requiring two doses for many employment sectors and recreational activities (e.g., travel, restaurant dining) as well as immigration to Canada were frequently mentioned by participants. Some simply said they got vaccinated to access such activities rather than for protection while others regretted getting vaccine based on external pressures (*Reinforcement, Goals*). In Toronto, strong emotions of anger and sadness were expressed by most participants who felt forced to get vaccinated and reflected on how their agency was removed when their employment and livelihood was threatened (*Emotion*). They also said mandates contributed to mistrust and suspicion in their communities about why the vaccine was being ‘pushed’, which fueled the spread of misinformation and rumours (*Beliefs about consequences*). In Peel Region and especially in Toronto, many participants firmly decided not to get vaccinated and said that nothing would change their minds (*Intention*). In both groups, several said that they would and did base major decisions on the presence of vaccine mandates, for example, if mandates were present, forgoing higher education or choosing not to move to Canada (*Intention*).

A few in each group said that their primary motivation for receiving first or first booster doses was to provide protection for their own health and that of their families (e.g., children, aging parents) and communities (*Goals, Social/professional role and identity*). One participant stated that the decision was borne out of love (*Emotion*).

Theme 6: Memory and Attention

In Ottawa and Toronto, participants compared the prevalence of communication materials and increased public awareness when the COVID-19 vaccine first became available to later in the pandemic, when they recalled little to no communication or talk of booster doses (*Memory, attention, and decision processes, Environmental context and resources*). Relatedly, an enabler recalled by Ottawa participants was receiving reminders and information for the first two doses via door-knocking teams, posters on busses, and text messages from a local pharmacy about the first booster dose (*Memory, attention, and decision processes*). Participants in Peel Region who were newcomers from Ukraine described the context of the Russian invasion of their home country as superseding other priorities such that the first booster dose was not considered beyond what was required for immigration to Canada (*Memory, attention, and decision processes, Environmental context and resources*). In Toronto and Ottawa, a sentiment of not paying attention to COVID-19 was shared by many participants, and some said they made a conscious choice to do so because they wanted to 'move on' and forget about the pandemic (*Memory, attention, and decision processes, Intention*).

Discussion

The uptake of COVID-19 vaccines has been lower among certain groups, including Black communities, those with fewer years of formal education, those of lower income, and newcomers to Canada[19,20]. In partnership with three Ontario PHUs (Ottawa, Peel Region, and Toronto), this study mapped barriers and enablers to vaccine uptake in Black, Eastern European, and low socioeconomic status communities and identified overarching themes, subthemes, and relevant TDF domains. Findings show that trust, mistrust, and social influences are dominant cross-cutting factors that shape how knowledge, perceived risk, cultural narratives, and structural and systemic conditions translate into vaccination behaviour. Our theoretically anchored analysis clarifies how multilevel constructs, such as beliefs about consequences, reinforcement, and environmental context, interact to influence community-specific patterns of hesitancy. Practically, results suggest several tractable targets for public health policy and programming in vaccination efforts more broadly, including building institutional trustworthiness, strengthening clinician communication, and tailoring access strategies for newcomers. Findings also support research priorities related to testing trust-building interventions, improving provider-focused communication strategies, and further examining community-specific influences on uptake of vaccines for COVID-19 and beyond.

The use of the TDF enabled systematic identification of determinants of vaccination barriers and enablers across communities. By mapping qualitative findings to specific domains, the framework clarified whether determinants reflected limitations in capability (e.g., *Knowledge*), opportunity (e.g., *Environmental context and resources, Social influences*), or motivation (e.g., *Beliefs about consequences*)[39]. This enhanced the interpretability of the findings and strengthened their translational relevance for future intervention design.

The Social influences domain encapsulated dominant, cross-cutting determinants of vaccination decisions, that were closely linked to trust and mistrust. Conversations with trusted others, particularly

faith leaders and primary care providers, were commonly reported contexts where influences were expressed. The principal TDF domains that functioned within the broader context of social influences to shape vaccine uptake were *Beliefs about consequences, Emotion, Social/professional role and identity, Knowledge, and Reinforcement*. Black and Indigenous participants situated mistrust in the context of systemic racism and historical medical atrocities[48,49], whereas many Eastern European newcomers linked mistrust to experiences of government corruption in countries of origin, consistent with other research involving Black populations and refugees[50,51]. Conversely, most participants who had three or more doses did not identify as Black, Indigenous, or newcomer and reported high levels of institutional trust. Vaccine mandates were often described as coercive, undermining agency and amplifying distrust, particularly by Black participants – echoing prior studies in Canada showing that coercive public health strategies can erode trust[52,53]. Past research shows differences in how trust influences COVID-19 vaccination behaviour across groups, including variation between Black and White populations in the value placed on discrimination-free care and in media ecologies.[54,55]

Social networks, religious leaders, and social media are primary conduits for both trust and mistrust, reinforcing prior work demonstrating the central role of informal social systems in shaping COVID-19 vaccine beliefs[56,57]. Rumours and narratives regarding vaccine harms, often encountered through family, friends, or online platforms, were frequently cited as barriers and contributed to heightened concerns about adverse effects. Conversely, trusted messengers could counter institutional scepticism, though the direction of influence depended on message framing, as observed in other studies with ethnic minority communities in Canada, the USA, and Romania.[27,55,58–60]

Primary care providers operated within this broader social context and were generally described as positive influences, aligning with evidence that healthcare providers remain among the most trusted sources of vaccine information for marginalized communities[27]. Clear explanations and confident recommendations supported uptake, tapping into domains of *Social/professional role and identity and Knowledge*, whereas perceived clinician ambivalence or uncertainty regarding booster doses functioned as a barrier for some participants. These findings extend previous work showing that inconsistent or hesitant provider messaging can inadvertently signal low importance of vaccination, even when access barriers are minimal. While education from healthcare providers has been shown to increase vaccine acceptance[61], some clinicians in Canada do not view COVID-19 vaccine counselling as part of their role[62], and organisational challenges within health systems can impede communication[63]. In the COM-B framework[39], these dynamics highlight the importance of social opportunity and reflective motivation, suggesting that interventions targeting trusted messengers and clinician communication practices may have substantial impact.

Knowledge and risk perceptions play important but partial roles in vaccination behaviour. Gaps in knowledge regarding how vaccines work or why boosters are needed were common, as reported in other studies with specific communities[13,27]. The principal TDF domains related to risk perceptions were *Knowledge, Beliefs about consequences, and Social/professional role and identity.* There was a common

belief expressed that vaccines should prevent infection, and thus, post-vaccination infection was interpreted as evidence that vaccines were ineffective, reinforcing mistrust. These findings add context to previous work that found greater vaccine mistrust among Black people who had a history of COVID-19 infection compared to those who did not[24].

In line with the Health Belief Model[29], perceived susceptibility and severity strongly influenced behaviour: many participants, particularly younger or healthier individuals, viewed COVID-19 as low risk and therefore saw limited benefit in doses or booster doses. Participants frequently cited identities of good health, strong immunity, or healthy lifestyles as reasons for non-uptake, consistent with prior research linking perceived invulnerability to lower vaccination intentions. Previous evidence also suggests that COVID-19 risk perceptions depend on the format of risk information: perceived risk increases when communicated by trusted scientific or medical sources and when people see similar others as vulnerable[64]. Culturally grounded beliefs, such as concerns that vaccines could weaken immunity or a preference for traditional remedies highlight limitations of risk messaging[60,65–67].

Accurate knowledge alone did not reliably translate into uptake, reflecting broader behavioural science evidence that information-based interventions are insufficient when not accompanied by changes in motivation and opportunity[39]. Together, our findings related to social influences suggest a need for clear information about risks and benefits, delivered by trusted sources, in accessible formats (e.g., social media), paired with culturally relevant framing and decision supports.

Institutional signals, communication, and perceived agency also shaped participants' decisions, within domains of *Reinforcement, Emotion*, and *Intention*. In line with previous work with Black communities in Canada[52,58], government mandates which required vaccination for employment or education were described as widely unpopular and coercive. Institutional policies and messaging were often interpreted as confusing or condescending, which exacerbated the spread of rumours and mistrust[52,58,68], reinforcing evidence that coercive policies can reduce vaccine intentions, even when communicated alongside uncertainty[68]. From a COM-B perspective[39], mandates alter physical and social opportunity but may undermine reflective motivation when perceived as unjust or imposed. These findings underscore the importance of institutional behaviour, beyond messaging, in shaping trust and vaccine uptake for specific groups.

Structural timing and competing priorities, particularly for newcomers, further shaped vaccination behaviour. Here, domains of *Environmental context and resources, Skills*, and *Memory, attention, and decision processes* were most salient. Resettlement demands such as housing, employment, childcare, and documentation frequently took precedence over vaccination. Language barriers and difficulties navigating an unfamiliar healthcare system compounded these challenges. These difficulties mirror broader findings on vaccination among newcomers in Canada and migrants in high-income countries[21,25,69,70] and can be mitigated when information and services are offered in relevant languages and via trusted community channels[71]. Participants contrasted early pandemic access, characterised by

convenient pop-up clinics and intensive outreach, with later stages, when booster access felt less important or more burdensome. The results suggest that conventional outreach strategies may be ineffective if they fail to account for the timing and cumulative burden associated with resettlement and limited access to resources, aligning with COM-B's emphasis on physical opportunity[39].

Future Directions

Future research should prioritise community co-development of interventions that explicitly map the identified TDF domains to BCTs that will inform intervention strategies. For example, interventions targeting *Social influences* may involve trusted community messengers; *Knowledge* and *Memory, attention and decision processes* may be addressed through tailored decision aids and reminders; *Environmental context and resources* through service redesign and co-located vaccination services, and *Social/professional role and identity* through clinician training and consistent recommendation practices[71]. Mapping TDF domains to BCTs provides a structured approach to designing interventions that address both individual-level decision-making and broader systemic barriers, while remaining responsive to community priorities.

Black scholars have cautioned that trust-building efforts are insufficient without parallel structural reforms that actively demonstrate institutional accountability and respect, especially for COVID-19 vaccination in Black communities[72–74]. In essence, trustworthiness precedes trust, and consistent behaviour precedes trustworthiness[72,74]. Public health officials and healthcare organizations need to invest in long-term trust-focused outreach with concrete steps to repair ruptures and improve institutional responsiveness[75].

Strengths and Limitations

The community engagement in this study extended our reach to include populations who have been historically excluded from research. Working with three sites allowed for methodological refinement and comparisons across groups and dose numbers, enhanced by our large sample size (N = 68) compared to studies of similar methods[76–80]. After the study concluded, external researchers conducted an arm's length evaluation of the quality of engagement of our research team with the community advisory groups, subgroups, and collaborators from the PHUs[44]. Results of the evaluation were positive overall and can inform future research practices[44]. Transferability of results across genders is limited by an overrepresentation of women in our sample (78%), which may have been a function of the majority-female community advisory groups, who referred participants. Previous research shows a higher prevalence of vaccine unwillingness in women, suggesting that our results may be skewed toward lower acceptance or stronger negative vaccine attitudes[24,81]. All interview data were coded by team members who were native speakers of the respective language, except for Eastern European languages, for which we did not have a fluent team member and thus relied on live translation. This may have implications for lost nuance or meaning from non-English interviews in the Peel Region.

This study advances understanding of how social and structural determinants interact in marginalized communities[21,82,83] and supports community-engaged, tailored, theory-informed strategies designed to build and sustain trust[84]. A theoretical framework and intersectional reflexivity enhanced the ecological validity of this rapid, community-partnered research, and elucidated pathways for public health interventions to increase COVID-19 vaccine uptake[46]. Collaborative behaviourial science initiatives such as the OPTimise Platform, that centre development and sustainability of trust within specific communities, merit further consideration. Future research should prioritize community-driven interventions (e.g., provider communication training, community-messenger programs) and measure effects on both vaccine uptake and on institutional trustworthiness.

Conclusion

Pervasive mistrust of government, health systems, and the COVID-19 vaccines help explain why well-intentioned promotion efforts can leave some communities behind. Demonstrable institutional trustworthiness shapes whether knowledge, risk messaging, and access translate into equitable vaccine uptake. Our findings indicate that trust-building strategies must be context-specific, community-driven, and paired with concrete actions to improve communication and structural access, particularly for newcomers.

Abbreviations

PHU = Public Health Unit

TDF = Theoretical Domains Framework

Declarations

Ethics approval and consent to participate

This study was approved by the Ottawa Health Sciences Network Research Ethics Board on December 4, 2020 (#2195). All data collection with human participants was conducted in accordance with the ethical standards of the institutional research board and the Declaration of Helsinki. Informed consent was obtained from all participants.

Consent for publication

Not applicable.

Availability of data and materials

De-identified datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author Contributions

JP conceptualised the OPTimise Platform, is the grant holder, led the study, and edited the manuscript. TL supported community partner engagement and participant recruitment, collected and analysed interview data, and wrote the manuscript. MW supported study design, community partner engagement, and data collection and analysis. EG supported community partner engagement, participant recruitment, and data collection and analysis. MS and GF led community partner engagement. KT, AA, and KZ supported data collection and analysis. GM and ZVA supported data analysis. NM and AP provided methodological expertise and guidance. KM, LEN, JB, and VD provided input and data from the PHUs. MW, CRT, JC, JG, TA, JB, SM, and MB are adjunct members of the research team responsible for reviewing and guiding the OPTimise Platform and its related work. All authors reviewed or contributed to the manuscript.

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Research team

The core research team who met regularly with the community advisory groups consisted of TL, EG, MS, GF, and JP. TL, a research assistant with a background in health psychology, trained interviewers KT, a physician and community partner, AA, a senior undergraduate student, and EG, a research coordinator with a background in social work and knowledge mobilization, who then trained KZ, a community partner and professional. The training included instruction on informed consent, confidentiality, notetaking and coding. GF and JP are senior health researchers with expertise in behavioural and implementation sciences. GF is also a trained nurse. MS is an experienced patient and citizen research partner with a background in education. AP and NM are senior health researchers with expertise in behavioural and implementation science methodologies. The core research team met weekly together, semi-regularly with the methods subgroup, and monthly with each community advisory group.

Positionality statement

I (TL) was the primary author responsible for conducting interviews, analyzing data, and reporting. As a White settler Canadian woman in academia working with community partners and participants of diverse ethnical, racial, and linguistic backgrounds on a sensitive health topic, I remain cognizant of how layers of differential power and privilege impact this research. I am not a member of Black or Eastern European communities, and I have not faced the language barriers, immigration, or medical mistrust many participants described. Early in conversations, I acknowledged demographic differences with partners and participants to show humility and spotlight their expertise. I recognize that regardless of efforts to “level the field”, the influence of academic and social structures permeates research, and I share the responsibility to identify and dismantle oppressive systems. I hold a structural view that situates low uptake in health systems’ failure to earn trust, not in the communities themselves.

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