Original Paper

Understanding the Use of X to Communicate Vaccine Rollout in the Region of Peel, Ontario, Canada, During the COVID-19 Pandemic: Descriptive Study

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Abstract

Background: Social media can facilitate community engagement and promote public trust but also fuel public mistrust. The Region of Peel (RoP) in Ontario, Canada, established a mass vaccination program (MVP) consisting of community-based and faith-based organization partners. While the overarching success of this collaborative model is recognized, the nuances in which public health units and local partners engage with each other to communicate with ethnoracially minoritized populations for vaccine outreach on platforms like X (formerly Twitter) remain unexamined.

Objective: This study aimed to characterize and assess the ways in which social media was used by public health officials and community partners to reach communities and spread vaccine uptake messages in the RoP, Ontario, Canada.

Methods: A descriptive approach was used to examine vaccine-related communication practices on social media platform X (formerly Twitter). Three methods—trend analysis, qualitative content analysis, and descriptive analysis—were used. Data collection was conducted from December 2020 to November 2021 using Brandwatch to collect and annotate COVID-19–related posts from the RoP and its 129 MVP partners throughout 3 phases of the vaccine rollout. To determine how the RoP used X during vaccine rollout, 24,637 posts were automatically annotated to identify its lead agency, the vaccine locations that the posts were promoting, the posts' intended priority populations, and whether posts contained tailored messages to faith-based communities.

Results: Peel used X as a medium for public service announcements to provide real-time information to the general public. Peel and its MVP partners (eg, community health centers, other public sector and nonprofit organizations) primarily focused on creating posts to engage Indigenous and Black communities. The main themes addressed public questions about vaccine efficacy, safety, and eligibility per provincial guidelines, booking procedures, and vaccine availability. Black and South Asian community-based organizations were Peel's most active partners on X. However, partners serving Punjabi and Hindu communities had limited visibility on X. Among faith-oriented community-based organizations, Muslim organizations were the most prominent in sharing religious messaging.

Conclusions: Peel leveraged existing relationships with partners to engage a broad audience about COVID-19 vaccines; its use of X demonstrated how strategic communication and partnerships can facilitate vaccine information sharing among

ethnoracially minoritized and faith-based groups. The findings underscore the value of integrating social media with broader public health strategies to enhance localized online vaccine engagement of diverse populations.

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Keywords: social media; ethnoracial populations; faith-based communities; vaccination; vaccine confidence; COVID-19; public health communication

Introduction

The strategic use of social media by public health agencies serves as an efficient tool for information dissemination during public health emergencies such as the COVID-19 pandemic [1,2]. Recognizing the limitations of generic public service announcements, public health agencies frequently collaborate with community partners to address vaccine concerns [3,4], enhance vaccine uptake by tailoring culturally sensitive messaging [5,6], and enable resource-responsive program improvements for ethnoracially minoritized communities [7,8].

The Region of Peel (RoP), consisting of the cities of Brampton and Mississauga and the town of Caledon in the province of Ontario, is one of the fastest-growing regions in Canada, attracting immigrants and newcomers who are ethnically and linguistically diverse [9]. In April 2020, the RoP had the highest number of COVID-19 cases, at 353 cases per 100,000, compared with the average of 205 confirmed cases per 100,000 [10]. In response, the public health department of the RoP—Peel Public Health (PPH)—used partner insights and data-driven reports to plan for mass vaccine rollout, drafting a mass vaccination program (MVP) that incorporated more than 200 community partners at its initiation in February 2021 [11] to reach priority populations and communities in Peel, such as Indigenous, Black, South Asian, Middle Eastern, and newcomer communities. Within 8 months of launching their vaccination campaign, residents of Peel achieved the highest vaccination rate in Ontario, in part due to community mobilization efforts to reduce barriers to vaccination among ethnoculturally diverse populations [12].

In addition to on-the-ground efforts, PPH increased its social media presence and virtual partnerships with local community-based organizations (CBOs) and faith-based organizations to communicate vaccine messaging and overcome in-person communication restrictions during lockdown and social distancing. To date, an evaluation of such interventions involving collaborations with ethnoracial and faith-based communities using social media is lacking. While a plethora of literature uses machine learning to track large-scale data on COVID-19 vaccine sentiment and vaccine misinformation [13,14], and others have examined vaccine messaging by public health agencies [6], these approaches did not capture the nuances of the extent of local partnerships.

Recent scholarship has examined how localized public health campaigns coordinate vaccine outreach with community stakeholders on social media in major urban centers, such as New York City and Los Angeles, to combat vaccine misinformation during COVID-19 in equity-deserving neighborhoods as part of the Centers for Disease Control and Prevention's Vaccine Confidence Network [13,14]. State and county health departments highlight a growing administrative reliance on digital networks to target specific faith communities and language-minoritized populations to mitigate systemic health access barriers [15,16]. While this expanding body of literature establishes the broad utility of social media partnerships during the pandemic elsewhere, no literature in Canada exists to describe the campaign efforts of public health agencies during the pandemic with local partners primarily focused on serving faith-based and ethnoracially minoritized populations.

Addressing this gap, we descriptively examine community partnerships by assessing which partners belonging to Peel's MVP were actively supporting the vaccine rollout on social media, analyzing the topics and audience reach of these partners to determine how ethnoracially minoritized and faith-based communities were engaged. We also sought to identify other active partners on the platform promoting vaccine messaging to explore future potential for collaboration in public health emergencies. The following 3 research questions (RQs) guided this study:

- RQ1: What were the main themes that RoP PPH posted on X during vaccine rollout?
- RQ2: Who were the most active MVP partners in Peel, and how did they engage with the public to promote vaccines?
- RQ3: Which ethnoracial and faith-based communities did RoP PPH and partners engage with on X, and how?

Methods

Study Design and Setting

This study applied a descriptive approach to retrospectively illustrate how social media practices on X (formerly Twitter) were used to promote COVID-19 vaccines in the most diverse public health unit region in Ontario and which partners in the MVP supported PPH's vaccine rollout using X (all data collected were from Twitter; the company was renamed X on July 23, 2023).

PPH, including its immunization services division, coconceptualized the RQs and methodology as a core knowledge user on the research team. Our evaluation included the RoP's social media strategy during the vaccine rollout and the established formal partnerships with various organizations and sectors, including community health centers (CHCs), CBOs, faith-based organizations, regional hospitals, and other public sector entities within the region, to facilitate vaccine uptake.

In 2022, PPH provided us with a list of the RoP's 129 MVP partners in the COVID-19 vaccine rollout. We collected all vaccine-related posts by and to Peel and MVP partners related to the COVID-19 vaccine. We applied a descriptive analysis using trend analysis, content analysis, and qualitative descriptive analysis to analyze the data to answer the 3 RQs.

Ethical Considerations

The overall study was approved by the Ethics Review Board of the University of Toronto (42490). No informed consent was required, as data were collected from publicly available posts via Brandwatch, adhering to X's Terms of Service. All individual user handles were redacted to preserve participant confidentiality; explicit attribution was limited strictly to public organizational partners. The collected datasets are stored in an encrypted institutional cloud folder and are accessible only to a limited number of researchers for data analysis.

Data Collection

Data collection was conducted using IQVIA's Brandwatch between December 15, 2020, and November 15, 2021, covering 3 vaccine rollout phases initiated by federal and provincial governments. The Boolean search terms were iteratively pilot-tested by MYS, A Aw, and HL, with support from the Brandwatch team within the Brandwatch platform to eliminate irrelevant content, out-of-jurisdiction geographic homonyms, and other false positives. Details on the phases and population eligibility for the province of Ontario are provided in Multimedia Appendix 1. Keyword queries were created to collect (1) all posts that ever mention "Peel Region" and "RoP" and vaccination in Ontario (D1), (2) all posts that mention vaccination from partners of the RoP's MVP in Ontario, as defined in the MVP (D2), (3) posts that mention vaccination and ethnicity in Ontario (D3), and (4) racist slurs related to COVID-19 vaccines (D4) (see detailed query in Multimedia Appendix 2). The 4 queries (D1-D4) captured *posts* and *mentions* from Peel and its MVP partners. *Mentions* include "retweets" (defined as a reposting of a post on X; "retweet" appears at the beginning of a post), *quoted posts* (defined as a repost that allows users to embed their own comments above the original post and publish it to their followers), and *tags* (defined as a post containing another account's X username, preceded by the "@" symbol) [17].

The keyword queries were iteratively pilot-tested and refined on Brandwatch prior to data extraction. Boolean proximity operators were tested and refined by adding NEAR/20 and NEAR/5 to strictly couple geographic identifiers with localized vaccine terms (eg, "Peel Region" AND vaccine*), COVID-19 vaccine-related vocabulary, and localized identifiers (eg, peel NEAR/5 "public health"). Only MVP partners and users directly interacting with Peel or who have mentioned the RoP in Ontario were included using search terms, for example (author:[regionofpeel OR theregionofpeel] and/or EngagingWith:regionofpeel). This approach inherently filtered out geographical homonyms and ensured that the captured discourse was spatially located within the RoP's public health jurisdiction. Non–COVID-19 immunizations and diseases (eg, NOT ["flu" OR "bovine" OR "MMR" OR "measles" OR "rabies" OR "monkeypox" OR "hpv"]) were excluded. The query results were reviewed manually, and the final corpus accurately isolated relevant, localized COVID-19 vaccine discourse. The complete Boolean search string used for data retrieval is available in Multimedia Appendix 2.

Data Annotation

The collected data were then processed for data annotation on Brandwatch. We constructed 5 categories of keyword groups for "Topic Segmentation," defined by Brandwatch as the labeling and extraction of specific keywords, URLs, and images to explore known and emerging trends [18]. The post patterns, including the volume and direction of mentions, reposts, quoted reposts, used hashtags, and the number of likes, were collected. Each category further included subcategories (see Table 1):

- Category 1: MVP partners by administrative leadership. There were 5 subcategories that outlined who the leading administrative partners were who oversaw vaccine promotion in Peel.
- Category 2: Vaccine events and settings. This category included 11 subcategories of locations where any form of vaccination activity might have occurred.
- Category 3: Priority populations. This category included 19 priority populations that the vaccine rollout posts were directed toward and that were defined by the Ontario Ministry.
- Category 4: Ethnoracialized communities. This category included 10 ethnicities that the vaccine rollout posts were directed toward.
- Category 5: Faith communities. This category included 7 subcategories of faith affiliations that were involved in vaccine promotion or were target audiences for vaccine promotion.

Table 1. Categorization and subcategorization for trend analysis.

Category ID	Category	Subcategories, n	List of subcategories
Category 1	MVP[a] partners by administrative leadership	5	Region of Peel Public Health led ("RoPPH-led"), Ministry of Health–led agencies ("MOH-led"), Ontario Health Team Supported Long-term Care Homes and Retirement Homes ("OHT-led"), Imandari Health Group Clinics ("Imandari Group"), and High Priority Communities Partners ("HPC Partners").
Category 2	Vaccine sites and settings	11	Includes community centers, community health centers, congregate settings, public places, nonprofit partner spaces, places of worship, schools, special event spaces, workplaces, and task-force–organized events.

Category ID	Category	Subcategories, n	List of subcategories
Category 3	Priority populations	16	To whom vaccine messaging was being promoted: including priority populations by age, ethnicity, faith, needs (eg, addictions and mental health, home care, assisted living, homebound, homelessness, newcomers, and refugees), and occupation (eg, health care and essential workers).
Category 4	Ethnoracialized communities	10	Black, East Asian, Indigenous, Jewish, Latin American, Middle Eastern/Arabic/West Asian, South Asian, Southeast Asian, and Eastern European[b].
Category 5	Faith-based communities	7	Main faith affiliations that encompass the majority of faiths in Ontario, such as Christianity, Islam, Sikhism, Buddhism, Judaism, Hinduism, and others.

[a]MVP: mass vaccination program.
[b]See detailed categorization in Multimedia Appendix 3. The ethnoracialized communities are identified as key vaccine engagement populations per Region of Peel.

To discover what types of accounts were most engaged in spreading vaccine messaging by the RoP, we tagged the top 50 most active and 50 most impactful account handles into 1 of 14 "Account Types." The account types were generated based on the RoP's MVP partners' list and manual identification of the professions and affiliations of these accounts, which included politicians, media, and the general public. While topic segmentation focused on labeling the posts themselves, labeling account types facilitated the identification of the types of active participants involved during the vaccine rollout (see Multimedia Appendix 4, Account Types). These categories and author list queries were used to label the collected data to extract topics for topic segmentation, generating trend analysis reports. We then manually annotated 100 of the posts with the widest reach each month from December 2020 to November 2021 to verify the accuracy of the automated data annotation on Brandwatch.

Trend Analysis

We used trend analysis to identify patterns in posts by the RoP and its MVP partners over time, allowing for an understanding of changes in outreach strategies. We analyzed metadata such as reach, engagement (eg, followership, reposts, quoted reposts, and comments), and post frequency.

Data Preprocessing and Topic Modeling

Prior to qualitative content analysis, we prepared the raw text corpus for topic modeling using a natural language processing pipeline. Initial text preparation included tokenization, lemmatization, and the removal of stop words. Term frequency-inverse document frequency was used to reduce the dimensionality of the topics, and text in retweets was counted once to reduce artificial overweighing of duplicate content. We then evaluated 3 machine learning models to extract latent thematic structures per the literature on state-of-the-art short-text topic modeling [19]: latent Dirichlet allocation, biterm topic model, and correlation explanation (CorEx). For each algorithm, we iteratively tested models with 2 to 15 topics. Optimal topic counts were determined based on model-specific performance metrics. CorEx reached peak covariance at 5 topics; hence, we used CorEx's topic modeling suggestions to extract representative posts for qualitative content analysis.

Content Analysis

Content analysis of Peel's posts was carried out via purposeful sampling to identify key themes of vaccine messaging explicitly showing that they were from the RoP. We extracted 270 posts by picking 20 to 25 posts from the list of posts with the most "likes" every month from December 2020 to November 2021. The posts were chosen based on the diversity of messaging directed toward faith-based and ethnically minoritized populations in Peel, as determined by the top 5 salient topics from CorEx's topic modeling results. The selected samples were independently coded by MYS, A Aw, and HL, with discrepancies resolved through consensus to ensure analytical rigor and trustworthiness, following content analysis procedures in the literature on vaccine confidence on social media [18-20]. We consulted PPH's communications manager throughout the analysis to account for the social media communication approach used by the RoP with key partners during the vaccine rollout.

Adopting a qualitative descriptive approach, we ensured that PPH's operational strategies, thematic priorities, and partnership dynamics were documented rigorously as they were naturally articulated by both PPH and its community partners. This method helped us stay close to the surface of events, where the experience was described from the viewpoint of PPH staff [20,21]. This descriptive analysis provided a nuanced understanding of how the RoP and its partners delivered vaccine messaging to diverse communities.

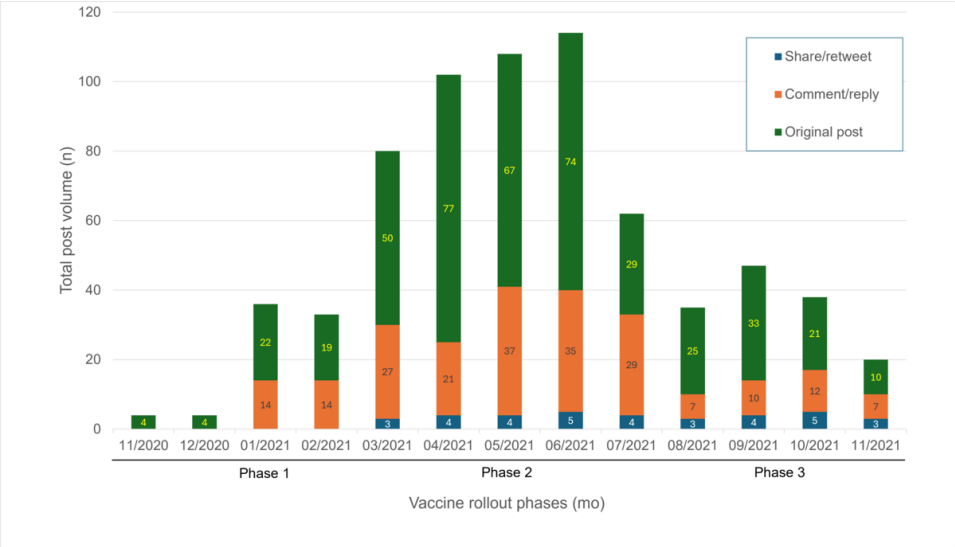
Results

Tweet Volume and Engagement Characteristics

A total of 24,637 posts were collected. Only 18.6% (24/129) of the partners mentioned or reposted the RoP's vaccine-related messages. Between December 2020 and November 2021, the RoP posted an average of 59 posts per month, consisting primarily of original posts, comments/replies, and reposts (see Figure 1). Almost daily, the public received vaccine updates on clinic locations, appointment bookings, and eligibility criteria. The communications team employed a strategic approach to optimize audience reach and increase website traffic to vaccine registration pages provided by the provincial government. During phase 1, the RoP began posting daily about vaccine availability and eligibility; its followership grew by 10.28% (3801/36,964). In phases 2 and

3, the RoP consistently reposted and shared vaccine-related content more frequently to boost engagement, resulting in a 20.1% (8184/40,765) increase in followership—from 40,765 followers in phase 1 to 48,949 followers within 3 months (phase 2). In phase 3, followership saturated, increasing by only 4.29% (2100/48,949) to 51,049 followers.

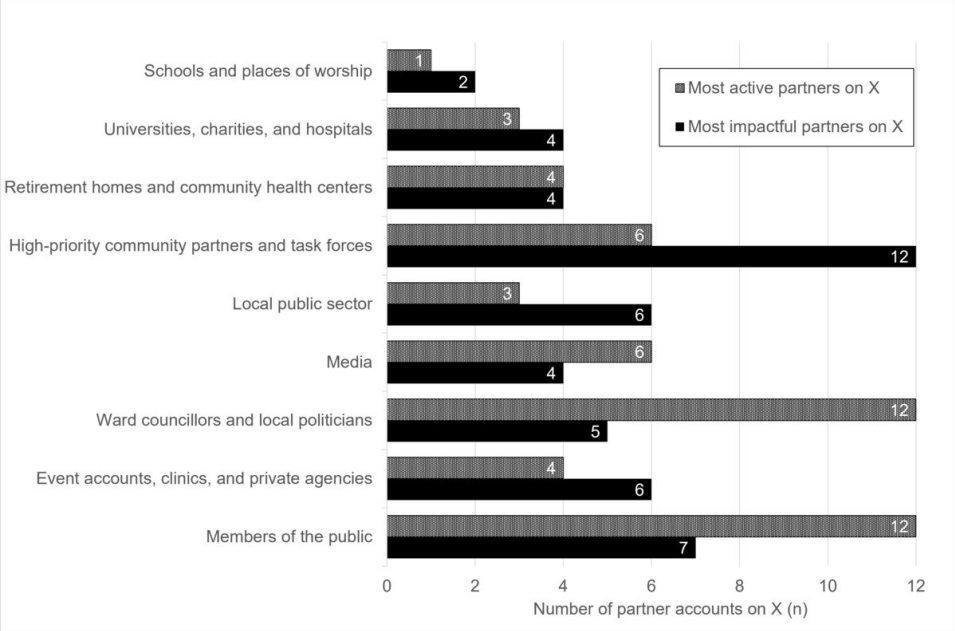
Figure 1. Region of Peel's posts during 3 vaccine rollout phases from December 15, 2020, to November 15, 2021.



The RoP used hashtags sparingly, as its communications team noted from prior experience that hashtags were an outdated means of topic searching and did not substantially enhance public engagement (D Fairservice, unpublished data, August 2023). Other MVP partners of the RoP, however, used hashtags like #gotmyteeka, #dosesafterdark, #ParamedicServicesWeek, #volunteersbringingchange, #realpeel, #thisisourshot, and #2dosechallenge in their posts to promote PPH's vaccine clinics. Additionally, the RoP responded strictly to comments specifically concerning vaccine efficacy, safety, and eligibility in accordance with provincial guidelines, booking information, and vaccine availability.

Verified accounts that engaged the most included elected officials, ward councilors, and politicians; local media outlets and reporters; members of the general public; and other public sector entities, demonstrating engagement commitment from noncontractual partners in spreading vaccine messaging (see Figure 2). However, when ranked by "Impact," which is Brandwatch's internal parameter to evaluate influence based on proprietary metrics such as the number of followers, reach, and repost longevity, the RoP's MVP partners ranked higher than nonpartners, except for Vaccine Hunters Canada (@VaxHuntersCan) and several high-profile journalists and public health physicians. Partners such as the RoP's police department, paramedics, public works, and High Priority Community partners were determined to be more impactful than elected officials, ward councilors, and politicians (see Figure 2).

Figure 2. The 100 most active and most impactful accounts on X regarding vaccine messaging in the Region of Peel.



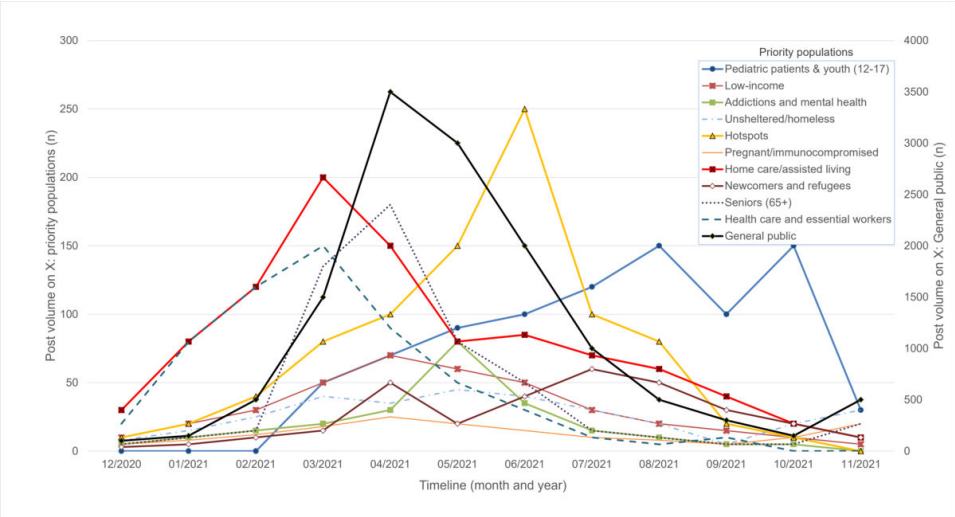
The RoP's Trending Topics During Vaccine Rollout From December 2020 to November 2021

We analyzed trending phrases over time to generate a word cloud that illustrates the public's attention related to COVID-19 vaccines; this included a total of 24,637 posts in which the RoP (@RegionofPeel) was mentioned across 3 phases of vaccine rollout. In phase 1, conversations surrounded eligibility dictated by outbreak locations (eg, postal codes), senior residences, and home care staff based on vaccine availability and provincial data. In phase 2, as vaccines became available to the general public, trending topics included campaigns and resources for vaccine appointments and answers about vaccine safety and the types of vaccines offered. In phase 3, as vaccines became more widely available, information and inquiries about second-dose COVID vaccines, walk-ins, and first-dose adolescent vaccines became trending phrases. The font size, representing the frequency of term usage, indicates that as vaccines became more widely available and accessible, the frequency of posts decreased.

Content analysis of the RoP's posts corresponded to trending phrases during the 3 phases of vaccine rollout in Ontario (see word cloud in Multimedia Appendix 5). In rollout phase 1, the main 3 themes included priority groups and vaccine eligibility updates, addressing side effects and safety concerns, and the hiring of immunizers by the RoP in response to vaccinator shortages in the region. In phase 2, the RoP mainly communicated where/how to book vaccine appointments, announced the postal codes of eligible hotspot residents who could register for vaccination, provided information about any emerging vaccine availability, and shared appreciation posts for its partners. In phase 3, the RoP posted messages to address "the fence-sitters," explain ways to obtain proof-of-vaccination receipts/certificates, and encourage first doses after COVID-19 vaccines were approved in Canada for adolescents and children.

The RoP and its partners engaged with 19 priority populations (see Multimedia Appendix 3 for detailed categorization). An analysis of post volumes from the RoP and its community partners revealed shifting messaging priorities throughout the vaccination campaign (see Figure 3). The "general public" category had the highest post volumes. The RoP posted daily vaccine updates on vaccination rates, and posts peaked midcampaign during phase 2 before declining as communication efforts shifted toward specific target populations. Early messaging focused on residents in retirement homes and nursing homes and frontline staff, reflecting their prioritization in the initial phases. Pediatric and adolescent vaccination messages saw a sharp spike in mentions following vaccine approval between March and April 2021, while mentions of marginalized groups, including "Low-Income," "Unsheltered and Homeless," and "Newcomers/Refugees," steadily increased after phase 2, demonstrating sustained equity-focused efforts. Consistent mentions of "Hotspots" from phase 1 to phase 2 reflected ongoing outreach in the RoP, and mentions of "Pregnant/Immunocompromised" individuals increased gradually, likely due to updated guidance on vaccine safety for these groups.

Figure 3. Priority populations in the Region of Peel and partners' vaccine messaging from December 2020 to November 2021.



MVP Partners and Their Engagement With RoP

Across all 3 phases, the RoP's vaccine-related posts were amplified by its MVP partners by 15 times, although only 18.6% (24/129) of partners with social media accounts were actively reposted the RoP's vaccine messages.

Among the most active accounts were High Priority Community Strategy–led agencies (HPC Partners). The HPC Partners consisted of 16 reputable CBOs within the RoP that were selected, funded, and given a profile by the Government of Ontario through Ontario Health to directly coordinate communication efforts with the PPH communications team. The HPC Partners were desirable and critical implementation partners to the region due to their longstanding service to in-need communities prior to and during COVID-19; they promoted vaccines as well as bridged health access gaps through the provision of social housing and health services. Agencies such as the Dufferin Peel Canadian Mental Health Association (@CMHAPeelDuff), Indus Community Services (@Indushelps), Services and Housing in the Province (@SHIPshey), and Dixie Bloor Neighborhood Center (@myDNBC) were actively reposting the RoP's messages.

Original content generation accounted for 87.4% (8879/10,159) of total partner post volume, substantially outweighing direct reposts of the regional health authority (1284/10,159, 12.6%). These findings demonstrate that community partners primarily operationalized their digital mandate through independent, tailored message creation rather than passive institutional amplification. The HPC Partners were 15.2 times more likely to promote their own vaccine messages and events (eg, town halls, knowledge sessions, and clinics) rather than simply reposting the RoP's messages. In contrast, Ontario Health Team (OHT)–supported communications, which coordinated long-term care homes and retirement homes, shared/reposted the RoP's messages 3.2 times more than they tailored their own messaging. Among the main 4 lead agencies, the 25 Imandari Health Group–led partners, which mainly consisted of shrines, temples, and other ethnic places of worship, rarely posted or reposted on X (n=115), in contrast to Ministry of Health (MOH)-, OHT-, and HPC-led partners.

The proportion of MVP partners who tailored their own content to support the RoP's vaccine rollout and mentioned the RoP in line (ie, the post included @RegionofPeel or "PPH" or "RoP Public Health" and its derivatives). MOH-led agencies created 66% (5860/8879) of the vaccine rollout posts; HPC Partners created 31% (2752/8879) of the posts, while OHT-led agencies in orange and Imandari Group created only 2% (178/8879) and 1% (89/8879) of the vaccine rollout posts, respectively. The proportion of MVP partners who reposted the RoP's messages are as follows: MOH-led agencies were responsible for 45% (578/1284) of reposts, HPC Partners were responsible for 23% (295/1284) of reposts, OHT-led agencies were responsible for 30% (385/1284) of reposts, and Imandari Group was responsible for 2% (26/1284) of reposts.

Ethnoracial Engagement

In phase 1, the RoP's and its partners' outreach to ethnoracial communities was most visible among Indigenous communities. Black and South Asian communities had the most visible active grassroots activity starting in phase 2.

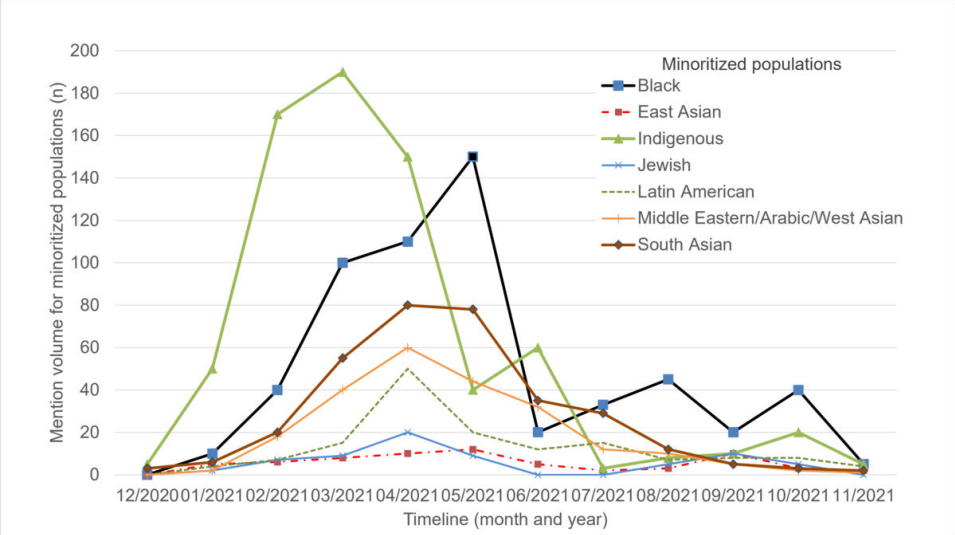
Wider vaccine availability during phase 2 allowed MVP partners to post tailored messages to ethnoracialized minorities in the RoP. Ethnoracial and faith-based COVID-19 Task Forces, which were nonpaid volunteer organizations, were established during the pandemic to support the RoP's MVP and province-wide vaccination promotion among their own communities and beyond. The most prominent Task Forces on social media were the Black Health Task Force (@Blackhealthtf), Latin American COVID-19 Task Force (@Lh_covidtf), Canadian Muslim COVID-19 Task Force (@CMCTF), Muslim Medical Society (@Muslimmeds), and the South Asian Health Network (@Sahealthnetwork). Government-funded HPC Partners included CBOs serving Black, African, and Caribbean (BAC) communities, for example, Black Health Alliance (@Blackhealthcan); ROOTS Community Services (@ROOTSCSPeel);

Punjabi communities, for eample, Punjabi Community Health Services (@Pchs4u), and ROOTS Community Services (@Rootscspeel). Altogether, HPC Partners and Task Forces constituted 66% (5860/8879) of the vaccine messaging.

The RoP and its MVP partners did not explicitly address racism in messaging during the vaccine rollout. Instead, members of the general public, politicians, journalists, and the media occupied the space related to race-based discussions. Racist posts in the region were, however, very rare, constituting 0.6% (147/24,503) of all messages, such as anti-Chinese and Sinophobic posts expressing mistrust and hatred toward the Chinese government.

Mention volumes peaked in March and May 2021, corresponding to critical phases in the vaccination campaign, such as expanded eligibility and intensified outreach efforts (see Figure 4). These peaks were particularly pronounced for Black, East Asian, South Asian, and Middle Eastern/Arab/West Asian populations, reflecting concerted efforts to engage these communities during periods of heightened public health focus surrounding vaccines. The targeted outreach during these phases likely aimed to address vaccine hesitancy and improve access in ethnoracially diverse regions.

Figure 4. Region of Peel COVID-19 vaccine messaging toward minoritized ethnicities from December 2020 to November 2021.

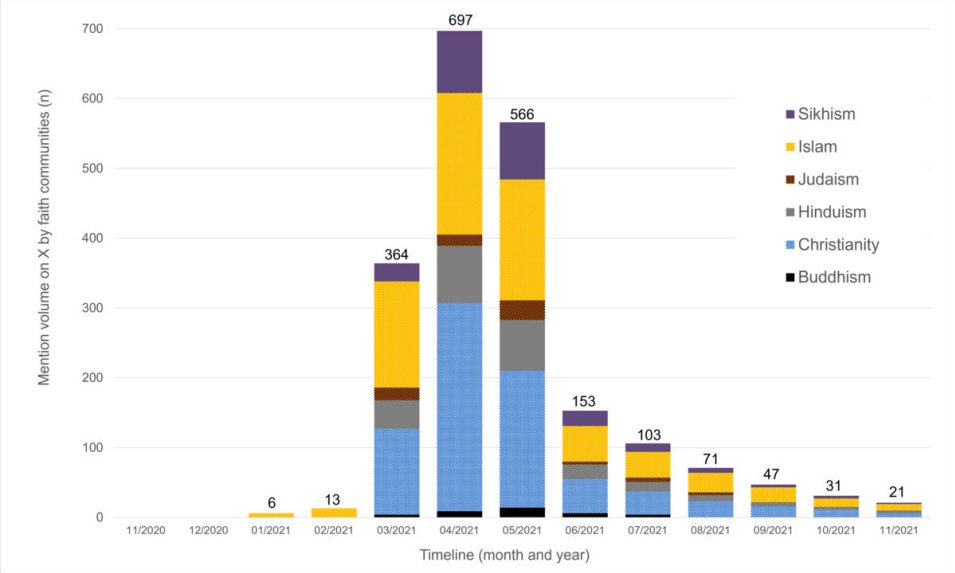


Group-specific trends revealed that posts to Black populations were sustained throughout phase 2 and trailed off in phase 3, with notable peaks indicating ongoing efforts to engage local communities and overcome systemic barriers to vaccination. Similarly, East Asian and South Asian communities experienced significant spikes in March and May 2021, followed by consistent engagement, suggesting a focus on maintaining momentum within these groups. In contrast, smaller populations, including Indigenous, Jewish, Latin American, and Southeast Asian communities, exhibited lower levels of messaging, indicating potential gaps in outreach or resource allocation. Overall, temporal trends in post frequencies aligned with the trajectory of vaccination doses administered in Ontario, indicating plausible correlations between the RoP's and its partners' engagement on X and the progression of vaccination efforts. Peaks in post frequencies corresponded to milestones in the vaccination campaign, such as expansions in eligibility criteria, a new phase of vaccine rollout toward residents in hotspots, and phase-related policy and guideline changes [22].

Faith-Based Outreach

Messaging volumes of faith-based outreach peaked in March and May 2021, which aligned with the onset of phase 2 and expanded eligibility within the RoP. As shown in Figure 5, Christians, Muslims, and Hindus received the most significant attention (see Figure 5), to an extent reflecting the demographics of the region and corresponding to major religious events such as Easter, Ramadan, Nowruz, and Holi.

Figure 5. Region of Peel's COVID-19 vaccine messaging toward faith-based communities from December 2020 to November 2021.



Task Forces, HPC Partners, hospitals, and CHCs were central to the promotion of faith-based vaccine clinics or vaccine clinics hosted in places of worship. Churches serving BAC communities had dedicated partners who posted on their behalf. For example, the Four Corners Regional Health Center used hashtags like #GetVaccinatedNow, #COVID19Vaccine, and #popupclinic to promote pop-up clinics at the North Park Worship Center in Brampton, Osler Health Network collaborated with the MOH, Bochasanwasi Akshar Purushottam Shri Swaminarayan Mandir (BAPS), and other community partners at the temporary pop-up BAPS Vaccine Clinic in North Etobicoke for individuals aged 18 years and older in select hotspots.

The Punjabi Community Health Services served the Sikh community with steady messaging throughout 3 phases, posting information on vaccine town halls, vaccination locations, and Q&A sessions, with noticeable spikes in reposts during the same peak periods. Other ethnoracial groups, such as those of Jewish and Buddhist faiths, also consistently received outreach, albeit at lower volumes, showing a consistent presence of vaccine communication strategies for these groups in the region. After May 2021, messaging volumes declined substantially across all groups.

Discussion

Principal Findings

The RoP used X to disseminate vaccine-related messages, leveraging partnerships with community organizations to engage diverse ethnoracial and faith-based communities during the COVID-19 vaccine rollout. The RoP's strategy of targeting vaccine eligibility, safety, and accessibility messages resulted in consistent engagement with priority populations. Active participation from the MOH, Ontario Health, and HPC Partners under their respective leadership demonstrates efforts to tailor messaging to address broader concerns of the general public and specific concerns and needs of ethnoculturally diverse minorities, including BAC, South Asian, Indigenous, Muslim, and Christian communities [5,23]. This multiagency coordination exemplifies a formalized public health–community action model, wherein top-down provincial institutional support enables localized partners to convert broad health directives into actionable service delivery [24]. These qualitative findings align with contemporary literature showing that cultural and faith-based interventions enhance vaccine uptake, particularly when implemented through equity-centered, collaborative, and community-centered approaches [25-27].

The RoP PPH's social media strategy for promoting vaccine uptake on X was shaped by several key considerations. First, X was leveraged as a cost-effective "information highway" because it is free, allowing for the timely dissemination of vaccine-related information without requiring user registration or sign-in, aligning with recent evidence on the effectiveness of open-access platforms for vaccine communication [28]. Systematic reviews of randomized controlled trials showed that the most effective way to encourage people to get vaccinated was to communicate vaccine safety and efficacy [29]. The RoP's communications approach of strictly discussing vaccine eligibility, safety, and availability created opportunities for other partners to follow suit. Second, the RoP's communications budget was strategically allocated to platforms such as Meta and Google Ads, allowing for culturally tailored advertisements aimed at engaging ethnoracially minoritized communities, a strategy shown to increase vaccine uptake in diverse populations [30]. Third, the decision to ignore "noise" on the platform, including antivaccine rhetoric and racist comments, reflected its primary function as an information dissemination tool, aligning with recommended strategies for handling misinformation in large-scale digital campaigns [31].

The RoP and partners communicated broadly with 7 ethnoracial communities, as categorized by our search query on X, from Indigenous communities to BAC, the South Asian diaspora, Arabic communities, Jewish communities, and East Asian communities. Although South Asian partner

organizations were critical to the MVP campaigns, their presence on X was minimal; this was largely due to the outreach strategy of the Imandari Health Group and the South Asian COVID-19 Task Force [32]. The Imandari Health Group had a contractual agreement to implement mobile and mass vaccine clinics held in places of worship serving the South Asian diaspora in the region and primarily conducted outreach through ethnic media, WhatsApp, Instagram, and places of worship [33]. The Imandari Health Group's divergence from other community partners' engagement patterns on X aligns with the Centers for Disease Control and Prevention's Prevention Research Center's Vaccine Confidence Network approach, which emphasized that trusted community messengers in high-priority communities have critical existing infrastructure that can be easily leveraged to overcome communication challenges such as language barriers, mistrust in government institutions, and agency bandwidth and capacity [34]. Although the RoP PPH itself primarily used X to broadcast vaccine messaging to the general public, this finding aligns with literature on public health units within Canada showing that health units mainly use X as a public service announcement channel [35,36]. Placing these descriptive findings within the international literature suggests that regional health authorities predominantly use X for unilateral information dissemination during communicable disease campaigns [13,16,37]. However, centralized agency messaging routinely experiences limitations when reaching ethnoracially minoritized populations. Our analysis of the Peel rollout confirms faith-based organizations and CHCs as active institutional partners in mitigating this limitation. Specifically, entities such as the Canadian Muslim COVID-19 Task Force, places of worship such as the BAPS Swaminarayan Mandir, and local Black worship centers actively engaged with the regional health authority and partnering provincial agencies. By coordinating vaccine promotion with major cultural and liturgical milestones, including Ramadan, Holi, and Easter, the RoP demonstrated an institutional partnership approach aligned with equitable crisis communication through trusted liaisons [34,38].

Finally, our findings provide an empirical assessment of institutional partnership visibility: only 18.6% (24/129) of the RoP's formal MVP partners engaged on the platform. This demonstrates that formal partnership status does not correspond to platform-specific activity. This study therefore contributes a Canadian municipal public health case to the literature, including information on the ethnoracial and faith demographic characteristics of those engaged on X during a phased pandemic response. By combining generic vaccine message dissemination with culturally matched peer-led amplification [39], public health agencies can build resilient, multitiered communication networks capable of advancing information equity during future crises, including future annual influenza and emerging vaccine-preventable pediatric immunizations.

Limitations

Our study has some limitations. First, while representation bias on social media is well documented, we extracted and analyzed official organizational accounts (eg, community centers, transit hubs, and cultural organizations) that act as proxies for reaching ethnoracially minoritized populations in the RoP. Consequently, the weak engagement observed among certain community handles is likely reflective of their general inactivity or lower digital engagement on X rather than a lack of actual offline community engagement. Therefore, the discourse captured may underrepresent the outreach efforts of local partners who rely heavily on alternative social media platforms or offline communication channels to reach structurally marginalized groups such as the Imandari Group. Second, this retrospective analysis is not generalizable to efforts beyond X. Expanding the analysis to other platforms will be ideal but is currently constrained by API restrictions and data-sharing policies on proprietary social media platforms. Third, the platform's active regulation and removal of racial, political, and antivaccine misinformation during the study period (March 1, 2021, to November 28, 2022) constrained our ability to identify potentially racist vaccine-related messaging [39,40]. While a multiplatform approach is requisite to fully understand equity-focused ethnoracial digital partnerships [41], assessing engagement for organizations serving ethnoracially minoritized populations across the digital ecosystem remains challenging due to restrictive API access. In the future, it will be essential to collaborate with partners and researchers to design quasi-experimental, knowledge-user–focused studies aiming to evaluate the correlation between vaccine uptake and social media strategies.

Conclusion

This study highlights the influential role that social media, particularly X, played in promoting vaccine uptake during the COVID-19 pandemic in the RoP. Culturally tailored and community-driven communication strategies enabled the region to engage with ethnoracial and faith-based communities, spreading messages promoting vaccine confidence among minoritized groups. The findings underscore the importance of leveraging trusted community partnerships and diverse communication channels to enhance the equitable reach of public health messaging. Future initiatives should focus on sustained, culturally informed outreach strategies that adapt to the needs of diverse populations, ensuring inclusive public health engagement.

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independently conducted all study conceptualization, data collection, data annotation, thematic analysis, data visualization, and original manuscript writing and maintain full responsibility for the final published content.
The statements, findings, conclusions, views, and opinions contained and expressed in this brief report are based in part on data obtained under license from the following IQVIA Solutions Canada Inc information services: Brandwatch database. The statements, findings, conclusions, views, and opinions contained and expressed herein are not necessarily those of IQVIA Solutions Canada Inc or any of its affiliated or subsidiary entities.

Generative AI Use

MYS used Gemini (Google LLC) strictly as a language-editing tool to format text, improve narrative flow, and perform grammar checks for clarity.

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Data Availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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Conflicts of Interest

None declared.

Multimedia Appendix 1

Three phases of Ontario's vaccine rollout plan.
[DOCX File (Microsoft Word File), 24 KB-Multimedia Appendix 1]

Multimedia Appendix 2

Twitter keyword queries.
[DOCX File (Microsoft Word File), 29 KB-Multimedia Appendix 2]

Multimedia Appendix 3

Annotated categories and subcategories.
[DOCX File (Microsoft Word File), 44 KB-Multimedia Appendix 3]

Multimedia Appendix 4

Account types.
[DOCX File (Microsoft Word File), 16 KB-Multimedia Appendix 4]

Multimedia Appendix 5

Trending phrases mentioning Region of Peel during vaccine rollout (December 2020-November 2021), with font size indicating the frequency of terms and the y axis showing major themes identified.
[PNG File (Portable Network Graphics File), 190 KB-Multimedia Appendix 5]

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Abbreviations

BAC: Black, African, and Caribbean
BAPS: Bochasanwasi Akshar Purushottam Shri Swaminarayan Mandir
CBO: community-based organization
CHC: community health center
CorEx: correlation explanation
HPC: High Priority Communities
MOH: Ministry of Health
MVP: mass vaccination program
OHT: Ontario Health Team
PPH: Peel Public Health
RoP: Region of Peel
RQ: research question

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