A Matter of Trust:
Building COVID-19 Vaccine Confidence among Diverse Communities in Canada and the United Kingdom

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Executive Summary

Over the course of the COVID-19 pandemic, the virus has undergone many mutations. Governments must continually update their health policies – often in seemingly contradictory terms – to protect the public from illness and death, and health systems from collapsing. This means persuading millions of people, not just once, but twice and three times each, to be vaccinated, while the virus and the messaging about it are in flux.

The purpose of our ongoing research, in Canada and the United Kingdom (UK), is to learn what methods to date have worked to improve COVID-19 vaccine confidence among the public throughout the pandemic and to share this information with policymakers, public health officials, community decision-makers and contributors to public discourse. Our goal is to better understand how policy changes and mis/disinformation are experienced in communities with low vaccine confidence and to identify community level interventions that can be used to develop vaccine confidence.

For this multiple methods study, our teams analysed and compared societal reception to COVID-19 vaccination policies, in particular the communication of those policies, across two distinct areas and populations, one in the UK and the other in Canada. Both areas studied had areas with lower vaccination rates and similar kinds of demographic subpopulations. We have characterized the evolution of relevant public health policies in terms of their content, context, actors and processes, seeking to learn more about how people understood and acted – or not – on COVID-19 health policy changes over time. We wanted to study which communication channels were used and how various populations responded to public health information and regulations; what other “unofficial” channels they may have used, for better or worse; and what community efforts might have built vaccine confidence among rural and urban communities.

We, firstly, examined the policy evolution through a desk review. Our data sources included government websites and official social media, which were used to identify operational COVID-19 policy documents, guidelines, laws and regulations. Search results were indexed, extracted and inserted into a spreadsheet for each country, then policy categories were devised based on how the policies were framed. Secondly, we characterised response to these policies through a series of individual interviews conducted in the East Midlands region of England and in Waterloo, a small, southern-Ontario city in central Canada. Finally, we compared our policy review to our qualitative analysis to gain insights into the influence of policy on vaccine programme equity and coordination.

Findings from the desk review indicated that Canada and the UK were able withstand uncertainty and fluctuations created by the global COVID-19 pandemic through

adopting a proactive stance. They ensured that their respective populations were able to access vaccines through creating actors dedicated to overseeing vaccine specific policy, such as the vaccine task forces, and by adopting a multisectoral response with targeted funding.

However, our findings also indicate that both Canada and the UK would have benefitted from more co-ordinated, consistent, and clear vaccine communications. When health policy makers tried to find the "perfect" way to communicate complex, changing information to the public, they tended to sow confusion and mistrust, creating vaccine hesitancy. Communicating evidence and data in widely accessible ways was important for engendering trust in the policies and processes. The believability of vaccine messages depended on the level of trust in who the messenger was. This varied between Canada and the UK and among different population groups, depending on the level of trust that was shown for politicians vs scientists vs public health doctors. Messaging had to be adapted and targeted for different communities, considering cultural and language differences. While community understanding mattered, approaches that explained the evidence and adopted a compassionate approach that emphasized individual benefits, as well as benefits for those close to an individual, were perceived as being more effective over the longer term than emphasizing community benefits to vaccination.

In both countries, adopting an approach that was open, responsive, shared information and created autonomy was seen as more effective than handing policies down from a traditional, rigid hierarchy. In the UK, the framing of vaccination policy as "protect the NHS" had the unintended consequence of worsening access to health care in already deprived communities; doctors abandoned routine activities to prioritise the vaccination programme. Funding of "community championship" schemes in the UK was not proactive, undermining the effort needed to keep vaccine acceptance levels high. At the same time, the UK commissioned key studies that were very valuable in informing vaccine schedules, booster programmes and vaccination of pregnant people, among others, including in other countries such as Canada.

With trust for the source and spokesperson at the centre of whether an individual would accept vaccine advice, we see a need for investment in public health outreach work that promotes good relationships with, and among, communities that may have low engagement with vaccination and other health care opportunities. Governments need to have transparent policies on vaccine approval processes that lay people can access and understand. Authentic, ethical statements about what vaccines can and cannot deliver need to be conceived and delivered in good faith. Transparency and open dialogue between the government and historically excluded groups must also be ongoing, as the sudden prioritizing of vaccination raised worries and mistrust in some.

We suggest that further study is needed to interrogate the role of trust, especially trust in policy actors. Specifically, how can we expand our understanding of who is a

trustworthy leader, especially if they are not in health care, the civil service or elected government? Which potentially important community actors are missing from the COVID-19 story? We have seen in this study that religious leaders can be trusted by many, for example, but what about the influence of women on health care action in communities? And at what point do people switch from wanting to do their duty as citizens of a country, to making a vaccine decision about themselves as individuals?

We also suggest that health policy makers prioritise the widest possible global sharing of the best, clearest and most up-to-date scientific information about COVID-19 – and whatever virus comes next – to help reduce the mis/disinformation that spreads like wildfire on social media, creates mistrust and limits vaccine uptake. COVID-19 continues to show us that no individual is immune, even if they are vaccinated, wherever they are in the world.

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List of Abbreviations

BAME – Black, Asian and Minority Ethnic
CCG – Clinical Commissioning Groups
CCT - Connect-Collaborate-Tailor
CHM – Commission on Human Medicine
CMO – UK Chief Medical Officer
CVST – Cerebral Venous Sinus Thrombosis
CQC – Care Quality Commission
DHSC – Department of Health and Social Care
DOI – Diffusion of Innovation Theory
EMA – European Medicines Agency
GP – General Practitioner
ICU – Intensive Care Unit
JCVI – Joint Committee on Vaccinations and Immunisation
MHRA – Medicine and Health Regulatory Agency
NACI – National Advisory Committee on Immunization
NHS – National Health Service
NICE – National Institute for Healthcare Excellence
PHAC – Public Health Agency of Canada
PSPS – Public Services and Procurement Canada
UK – United Kingdom
UKHSA – UK Health Security Agency
VTF – Vaccine Task Force
WHO – World Health Organisation

1. Introduction

Vaccines are the most effective tool for curtailing the COVID-19 pandemic, yet uptake remains suboptimal among certain communities in the United Kingdom (UK) and Canada.[1] Current evidence indicates that vaccine hesitancy can be influenced by many factors, such as vaccine efficacy and safety and misinformation/disinformation propagated over social media networks.[2] In both Canada and the UK, many of the communities identified as having low rates of vaccination belong to ethnic and religious minorities and/or socioeconomically disadvantaged local populations; hence, vaccination uptake can be closely tied to historical experiences of marginalisation.[3] Canada and the UK both have publicly funded healthcare systems and elements of a shared cultural history, offering an important opportunity to compare and contrast vaccine policy. This project aims to share lessons learned about addressing COVID-19 vaccine hesitancy within diverse community settings. More specifically, it compares social responses to policies and actions undertaken to build vaccine confidence in communities that have shown low, average or high levels of hesitancy in Ontario, Canada and the East Midlands in England, UK.

This introductory chapter examines literature on vaccine uptake by examining current evidence on vaccination rates in the UK and Canada. Then it adopts a theoretical lens to understand motivators for vaccine confidence and the role that programmes, and policies can play in enabling vaccination.

1.1. The state of vaccination

Early in the pandemic, world governments worked hard to secure vaccines to protect their citizens. While initial efforts focused on research, development, manufacturing and procurement, the constantly evolving nature of the SARS-CoV-2 virus that causes COVID-19, impacted even the best laid plans. Transmissibility and virulence of the new variants have been difficult to predict. Governments have depended on early indications from real world data to make important policy decisions in different phases of the pandemic. COVID-19 vaccination has been recognised as the mainstay intervention to control the pandemic. However, the prospect of achieving maximum public protection hinges on high vaccination coverage and uptake of not only the primary vaccination series but also booster doses, particularly as new variants of

[1] Government of the United Kingdom, *Vaccinations in the United Kingdom*, 2021. Available online: https://coronavirus.data.gov.uk/details/vaccinations [Accessed; Health Canada, *COVID-19 vaccination in Canada*, 2021. Available online: https://health-infobase.canada.ca/covid-19/vaccination-coverage/. [Accessed.
[2] M. Mills et al., 'COVID-19 vaccine deployment: behaviour, ethics, misinformation and policy strategies', [Lecture]2020, unpublished).
[3] P. Patel et al. **Reference type not supported**; L. Richardson & A. Crawford, 'COVID-19 and the decolonization of Indigenous public health', *Cmaj*, 192, 38 (2020), E1098-E1100.

concern emerge and considering those at most risk of severe illness and death from COVID-19.[4]

Mathematical models have predicted that vaccine refusal rates above 10% can jeopardise community or “herd” immunity.[5] As of January 2022, an estimated 9% of the eligible UK population aged 12 years and above had not yet received any COVID-19 vaccinations, compared to 12% of eligible Canadians aged 5 years and older. With regards to boosters, 46% of eligible Canadians 18 years or older had received a booster compared to 64% in the UK. [6]

The factors that contribute to COVID-19 vaccine hesitancy are largely the same as those observed in other vaccination programmes. They include poverty and deprivation, low health literacy, lack of childcare, mistrust of the medical system, personal value systems, concerns about safety, perception of low risk or infection, mis/disinformation and historical injustices against some racialised groups.[7] However, some reasons for vaccine hesitancy are unique to the COVID-19 vaccination programme, such as the perceived loss of autonomy through the introduction of vaccine passports and mandates, which can paradoxically increase vaccine rates while also increasing distrust or public resistance.[8] Among both healthcare workers and community members, we also see inequalities in the uptake of vaccines based on ethnicity and other demographic factors. However, some structural inequalities are traceable to COVID-19 policies that initially focused more on older adults and at-risk populations.[9] This highlights how policies that prioritize vaccines or increase vaccine uptake can also have unintended negative consequences for some groups.

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[4] L. Eaton **Reference type not supported**; E. Mahase **Reference type not supported**; M. K. Patel **Reference type not supported**; R. Wang et al., 'Vaccine-escape and fast-growing mutations in the United Kingdom, the United States, Singapore, Spain, South Africa, and other COVID-19-devastated countries', *arXiv preprint arXiv:2103.08023* (2021).

[5] L. Thunstrom et al., *Hesitancy towards a COVID-19 vaccine and prospects for herd immunity*, 2020. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3593098 [Accessed.

[6] Government of the United Kingdom, *Vaccinations in the United Kingdom*; Health Canada, *COVID-19 vaccination in Canada*.

[7] E. Dubé et al., 'Understanding vaccine hesitancy in Canada: results of a consultation study by the Canadian Immunization Research Network', *PloS one*, 11, 6 (2016), e0156118; J. Luyten et al., 'Assessing vaccine hesitancy in the UK population using a generalized vaccine hesitancy survey instrument', *Vaccine*, 37, 18 (2019), 2494-2501; S. B. Omer et al., 'Promoting COVID-19 vaccine acceptance: recommendations from the Lancet Commission on Vaccine Refusal, Acceptance, and Demand in the USA', *The Lancet*, 398, 10317 (2021), 2186-2192.

[8] S. Sethi et al., 'The UPTAKE study: a cross-sectional survey examining the insights and beliefs of the UK population on COVID-19 vaccine uptake and hesitancy', *BMJ open*, 11, 6 (2021), e048856; M. C. Mills & T. Rüttenauer, 'The effect of mandatory COVID-19 certificates on vaccine uptake: synthetic-control modelling of six countries', *The Lancet Public Health*, 7, 1 (2022), e15-e22; J. Griffith et al., 'COVID-19 Vaccine Hesitancy in Canada: Content Analysis of Tweets Using the Theoretical Domains Framework', *Journal of medical Internet research*, 23, 4 (2021), e26874-e26874.

[9] G. Iacobucci **Reference type not supported**; Omer et al., 'Promoting COVID-19 vaccine acceptance: recommendations from the Lancet Commission on Vaccine Refusal, Acceptance, and Demand in the USA'; Sethi et al., 'The UPTAKE study: a cross-sectional survey examining the insights and beliefs of the UK population on COVID-19 vaccine uptake and hesitancy'.

The acceptance of vaccines is by no means constant and there is no guarantee that receiving a first dose of the primary course of vaccination will lead to a completed primary series or to successive booster doses. In fact, uptake of future doses can be impacted by lack of accessibility, experienced side effects with prior doses, perceived lack of vulnerability to severe illness due to age or health status and societal influence, among other things.[10]

1.2. Diffusion of innovations

COVID-19 vaccines were developed with new technologies in record time, with new technologies. Many countries approved them through emergency processes in an effort to curb the enormous impact of the novel SARS-CoV-2 coronavirus in their populations.[11] The rapid development of the vaccines and their emergency approval has since been at the centre of many debates and conspiracy theories. Yet, even well-intended debunking interventions can produce unintended consequences through triggering "continued influence effect," a phenomenon through which people continue to retrieve misinformation from memory even when acknowledging the correction.[12] A number of theories may enhance understanding of how vaccine uptake can be fluid and evolve over time. One is the diffusion of innovations theory, which provides a useful theoretical perspective to explore the introduction of vaccinations, vaccine policy and the ebbs and flows of vaccine uptake in a population.[13] Historically, the theory has been applied to a wide range of public health issues, including digital health interventions; combating the spread of HIV and antimicrobial resistance; contributing to significant advancements in health promotion and disease prevention.[14] Here, the theory can also offer insights as to how, why and the rate at which, COVID-19 vaccinations are being adopted through populations and social systems. In particular, the diffusion of innovations theory argues that the adoption of an innovation is influenced by the innovation's nature and its perceived complexity or attributes. Such attributes include the innovation's perceived relative advantage when compared to other options; compatibility with prevailing values and practices; the extent to which an innovation can be modified; simplicity of use and; observability or visualisation of its results.[15] The theory further postulates that adoption is determined not only by the

[10] S. Bedston et al., 'COVID-19 vaccine uptake, effectiveness, and waning in 82,959 health care workers: A national prospective cohort study in Wales', *Vaccine* (2022); G. Iacobucci **Reference type not supported**; K. M. Sønderskov et al., 'COVID-19 booster vaccine willingness', *Danish medical journal*, 69, 1 (2022).
[11] Z. Andreadakis et al., 'The COVID-19 vaccine development landscape', *Nature reviews. Drug discovery*, 19, 5 (2020), 305-306.
[12] S. van der Linden et al., 'Inoculating against COVID-19 vaccine misinformation', *EClinicalMedicine*, 33 (2021).
[13] P. E. Plsek & T. Greenhalgh, 'The challenge of complexity in health care', *Bmj*, 323, 7313 (2001), 625-628; E. M. Rogers, *Diffusion of innovations* Simon and Schuster, 2010).
[14] M. Haider & G. L. Kreps, 'Forty years of diffusion of innovations: utility and value in public health', *Journal of health communication*, 9, S1 (2004), 3-11.
[15] J.-L. Denis et al., 'Explaining diffusion patterns for complex health care innovations', *Health care management review*, 27, 3 (2002), 60-73; T. Greenhalgh et al., 'Diffusion of innovations in service organizations: systematic review and recommendations', *The milbank quarterly*, 82, 4 (2004), 581-629.

characteristics of the innovation but also by communication channels, time and the social system. Thus, contextual circumstances, health system factors, and characteristics and behaviours of the adopters are all crucial for the adoption of an innovation such as vaccination.[16]

The diffusion of innovation theory classifies adopters on a continuum from innovators, early adopters, early majority and late majority to laggards, herein referred to as traditionalists. Innovators are a small minority willing to be the first to try an innovation and are followed closely by the early adopters, who are comfortable with change and new ideas. The early majority look to the experiences of the early adopters but require evidence that the innovation works before they can adopt it. The late majority are sceptical of change and will wait until innovation is well-accepted and adopted by most of the population and/or until they will lose something by further delaying adoption, such as employment, income or social status. The final group, traditionalists, are more conservative, sometimes with good reason, and are the last to accept new technologies. Traditionalists are generally the hardest group to reach, often due to a lower social connection or status.[17] Individuals shift between groups depending on how the innovations align with their beliefs and values.

Overall, the trajectory taken by individuals in adopting an innovation over time may be contingent on decisions taken by others, the collective, or even by authorities. For example, late majority adopters with a wait-and-see attitude may be best targeted through success stories observed over time. Also, little intervention may be needed for the innovators or early adopters, but the early majority may need general information about the vaccine. Thus, interventions need to evolve with the different waves of adoption. The late majority adopters with a wait-and-see approach may be best targeted through success stories observed over time and responses to mandates or passports,[18] but traditionalists will need prolonged engagement and trust-building. As COVID-19 vaccines have become widely available and diffused through communities, it is important to reflect on their uptake over time and understand how community experiences and policies may have shifted during the pre-adoption, early use and established use phases.[19] It is also important in informing future policy.

1.3. Interventions for improved vaccine uptake in Canada and the UK

Attitudes are hard to change when vaccine hesitancy is deeply engrained in a person. Efforts to build vaccine confidence tend to focus on the “moveable middle,” which

[16] Plsek & Greenhalgh, 'The challenge of complexity in health care'.
[17] Greenhalgh et al., 'Diffusion of innovations in service organizations: systematic review and recommendations'.
[18] *Ibid*
[19] *Ibid*

includes the late majority, who are uncertain about vaccines but not necessarily opposed to them.

The Royal Society of Canada's Vaccine Acceptance Framework identifies communication as a key feature for improving vaccine acceptance by the moveable middle, with a pressing need for COVID-19 vaccine programmes to be "tailored through active engagement and cocreation by the community to meet local needs" and to include "immunisation ambassadors," such as religious or community leaders.[20] Similarly, the UK government has identified removal of access barriers, community-led, government supported partnerships, public sharing of data through television, radio, social media and printed materials, and conversation and engagement of "community champions" as key interventions for increasing vaccine uptake.[21]

Overall, both Canada and the UK follow similar well-recognised approaches to increasing vaccine uptake. They include ensuring open dialogue about vaccine science; providing easy access to vaccines; decentralising vaccine programmes to ensure access is appropriate for the local context (language, transportation, information); prioritizing/targeting higher risk and marginalized groups; and countering misinformation.[22] The focus is on communication that is consistent, from trusted sources, tailored to specific communities, reframed around risk of infection rather than the vaccine, and messaging that is empathetic highlighting positive social norms, such as communicating that a majority has been vaccinated.[23]

Despite the deployment of targeted interventions across both countries, online mis/disinformation emerged as a constant threat to vaccine confidence and one that works against many public health efforts.[24] Yet a report by The Royal Society and the British Academy has cautioned that a focus on misinformation alone is not enough to address vaccine hesitancy, as causes may not be attributed to misinformation *per se* but to a genuine deficit or void of information. Thus, it is critical that we examine vaccine adoption, including the influence of misinformation, and to also consider the extent to which knowledge deficits are being addressed. Further, recognizing that efforts to improve vaccine confidence must go beyond mere provision of scientific facts, it is also critical to consider how communities have been engaged in vaccine

[20] N. E. MacDonald et al., 'Royal society of Canada COVID-19 report: Enhancing COVID-19 vaccine acceptance in Canada', *Facets*, 6, 1 (2021), 1184-1246.
[21] N. Mutebi, *COVID-19 vaccine coverage and targeted interventions to improve vaccination uptake*, 2021. Available online: https://post.parliament.uk/covid-19-vaccine-coverage-and-targeted-interventions-to-improve-vaccination-uptake/ [Accessed.
[22] Mills et al., 'COVID-19 vaccine deployment: behaviour, ethics, misinformation and policy strategies'.
[23] ITV News **Reference type not supported**; J. Presseau et al., 'Behavioural science principles for supporting COVID-19 vaccine confidence and uptake among Ontario health care workers', *Science Briefs of the Ontario COVID-19 Science Advisory Table*, 2 (2021), 12.
[24] T. L. I. Diseases, 'The COVID-19 infodemic', *The Lancet. Infectious Diseases*, 20, 8 (2020), 875; K. Woolf et al., 'Ethnic differences in SARS-CoV-2 vaccine hesitancy in United Kingdom healthcare workers: Results from the UK-REACH prospective nationwide cohort study', *The Lancet Regional Health-Europe* (2021), 100180.

decision-making processes, including how their values, beliefs and experiences were considered.[25] Reflection is essential to ensure dialogues about vaccine deployment are open and transparent, with clarity on the level of uncertainty, effectiveness, safety and rationale for prioritisation, and tailored to the groups that will benefit most. It is also important to measure or understand how all of these factors play into trust with individuals and communities.[26]

1.4. COVID-19 vaccine policy development

Health policies have been broadly defined as a system of laws, regulatory measures, courses of action (and inaction) and funding priorities concerning a given health issue, that is adopted by a government or its entity at the national, subnational or local level.[27] Health policies are central to health service delivery, such as vaccination. A pandemic is a time of rapid health policy development and revision. Critical assessment of health policies can guide construction and dissemination of future pandemic and non-pandemic vaccination programmes and policies. For the COVID-19 vaccination policy in particular, the rapid development of the COVID-19 vaccines meant that emergency policy measures were needed to speed vaccine approval, fuelling vaccine hesitancy, scepticism and misinformation.[28] Therefore, COVID-19 vaccination deployment programmes ought to be underpinned by clear and inclusive policies that are communicated with clarity to ensure their effective uptake.

To recap, while efforts to track COVID-19 policies internationally are ongoing, little research exists on community experiences with vaccine policy communication during a pandemic. This study aims to reflect on the trajectory of vaccine-specific policies in Canada and the UK, and to compare efforts to encourage vaccinations in communities with low vaccine confidence, including how these efforts were experienced and perceived by policy makers, implementers and community members. The following section offers an overview of the methodology of this project.

1.5. Study context

The study is set in the East Midlands region of England in the UK and in the Canadian province of Ontario. England is the only country in the UK without a devolved parliament. Its health policies, including COVID-19 policies, are closely aligned with overall UK policy. In contrast, Canada has a highly decentralised health care system that allows each province and territory to enact policies that are tailored to local

[25] Mills et al., 'COVID-19 vaccine deployment: behaviour, ethics, misinformation and policy strategies'.
[26] *Ibid*
[27] K. Buse et al., *Making health policy* McGraw-hill education (UK), 2012); G. Walt et al., ''Doing'health policy analysis: methodological and conceptual reflections and challenges', *Health policy and planning*, 23, 5 (2008), 308-317.
[28] Andreadakis et al., 'The COVID-19 vaccine development landscape'.

contexts regarding COVID-19.[29] The study was designed to complement existing government-community partnerships in the East Midlands, UK and an ongoing research programme by the University of Waterloo (Canada) on fostering confidence in COVID-19 vaccines in Ontario. The “fostering confidence in COVID-19 vaccines” in Ontario programme run by the University of Waterloo uses participatory research methods framed within a Connect-Collaborate-Tailor (CCT) model, whereby researchers connect with communities, collaborate with them to identify facilitators of vaccine confidence and co-develop targeted or tailored interventions that address the needs of the community.[30] Through the study partnership, we aimed to better understand how COVID-19 vaccination policies evolved through the pandemic and how different communities experienced these changes so as to identify the approaches that can be used to build vaccine confidence. The collaboration offered an opportunity for inter-country learning on strategies that were tried and worked well (or those that were tried and did not work well) in building vaccine confidence among geographically, economically and ethnically diverse populations.

1.6. Why East Midlands and Ontario

East Midlands and Ontario both have variations in geography (rural/urban) and demographic subpopulations (ethnicity, socioeconomic level) that have led to some areas where vaccination rates are lower than national averages.[31] The research provided an opportunity for comparisons of approaches across the different geographical areas and populations.

1.7. Research objectives

The specific research objectives were to:

- To conduct a comparative analysis of COVID-19 vaccination policies by characterising their evolution in terms of content, context, processes and actors in both Canada and the UK.
- To understand the communication channels that were used to convey policy changes relating to COVID-19 vaccines over time and their impact in terms of societal response to the communications.
- To understand community-level efforts that are being made to build vaccine confidence among rural and urban hesitant groups.

[29] A. Cyr et al., 'An Inconsistent Canadian Provincial and Territorial Response During the Early COVID-19 Pandemic', *Frontiers in public health*, 9 (2021).
[30] K. Grindrod, *COVID-19 Health Resources*, 2021. Available online: https://uwaterloo.ca/pharmacy/health-resources/covid-19-health-resources [Accessed.
[31] Health Canada, *COVID-19 vaccination in Canada*; Government of the United Kingdom, *Vaccinations in the United Kingdom.*

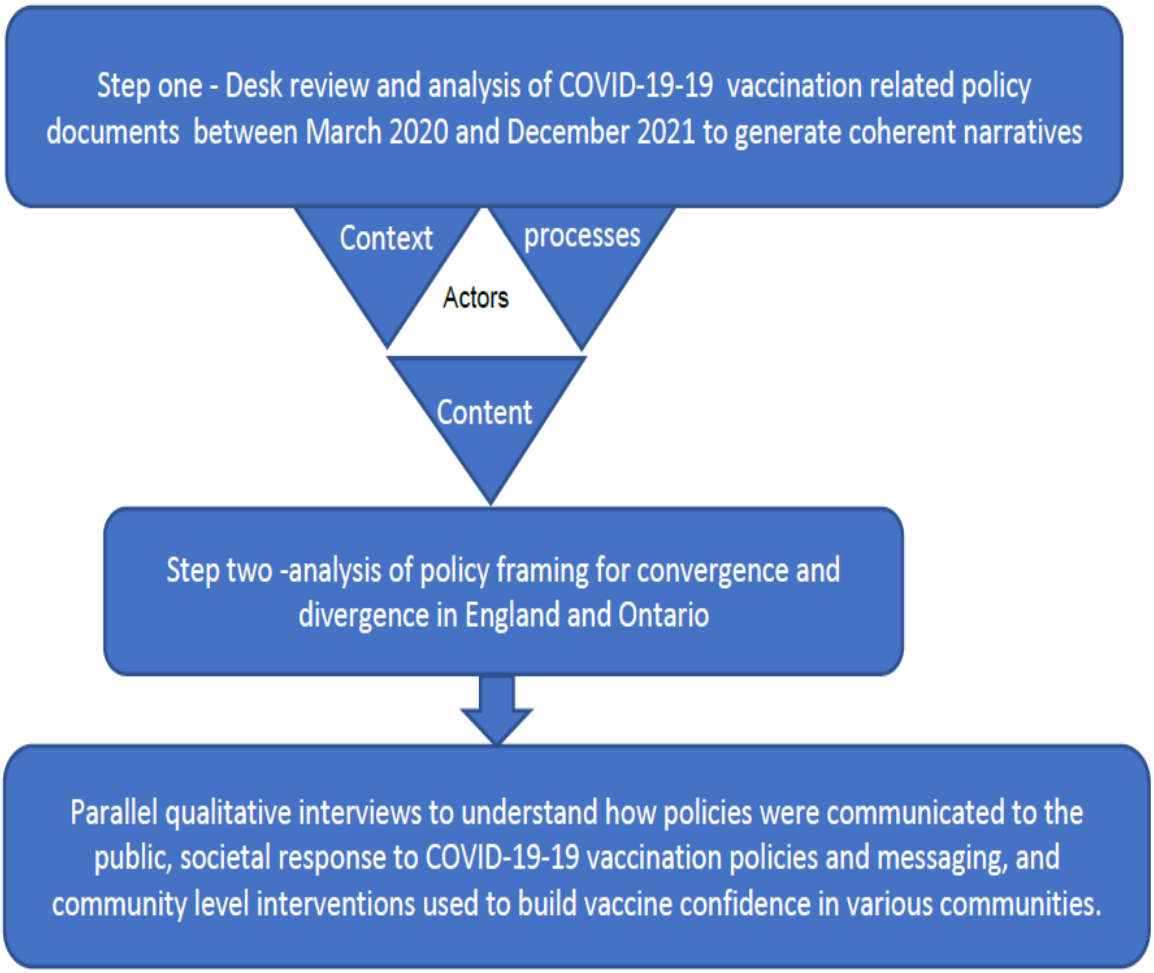
- To share lessons learned on “what works” in improving vaccine confidence with policymakers, public health, decision makers and public contributors.

1.8. Research approach

The study explored what (content), how (processes), why and when (context), to whom and by whom (actors) and with what effect COVID-19 vaccination related policies were communicated during the pandemic (Figure 1). We operationally defined COVID-19 vaccination policies as a system of laws, regulatory measures, courses of action (and inaction) and funding priorities that were adopted by the government or its entity at the national, subnational or local level.[32] Each study objective was addressed through two interlinked work packages (WPs). The first WP (Chapter 2) was a comparative policy analysis of COVID-19 vaccination policies in Canada and UK. This WP was a desk review (described in the methods section below) and analysis of online policy documents, statements and guidelines that generated detailed chronological narratives of COVID-19 vaccination policies in East Midlands and Ontario, between March 2020 and December 2021. The second WP (Chapter 3) consisted of a series of in-depth interviews on vaccine policy, conducted with health system staff members, community workers and members of communities identified as having high or low vaccine uptake between November 2021 and January 2022. WP2 was informed by the diffusion of innovations theory. Methodological details and study findings are presented separately in the following sections. We further discuss how findings and approaches in the UK and Canada converged or diverged. In Chapter 4, we discuss the implications of our findings for policy makers, with recommendations on how to build vaccine confidence in diverse communities. Methodological details and study findings are presented separately for each component below. Finally, we discuss their implications and offer insights into how vaccine confidence can be improved in diverse communities.

Figure 1: Diagrammatic representation of the study approach

[32] Walt et al., ''Doing'health policy analysis: methodological and conceptual reflections and challenges'; Buse et al., *Making health policy*.


Step one - Desk review and analysis of COVID-19-19 vaccination related policy documents between March 2020 and December 2021 to generate coherent narratives
Context
processes
Actors
Content
Step two -analysis of policy framing for convergence and divergence in England and Ontario
Parallel qualitative interviews to understand how policies were communicated to the public, societal response to COVID-19-19 vaccination policies and messaging, and community level interventions used to build vaccine confidence in various communities.

2. Policy analysis

2.1. Methods

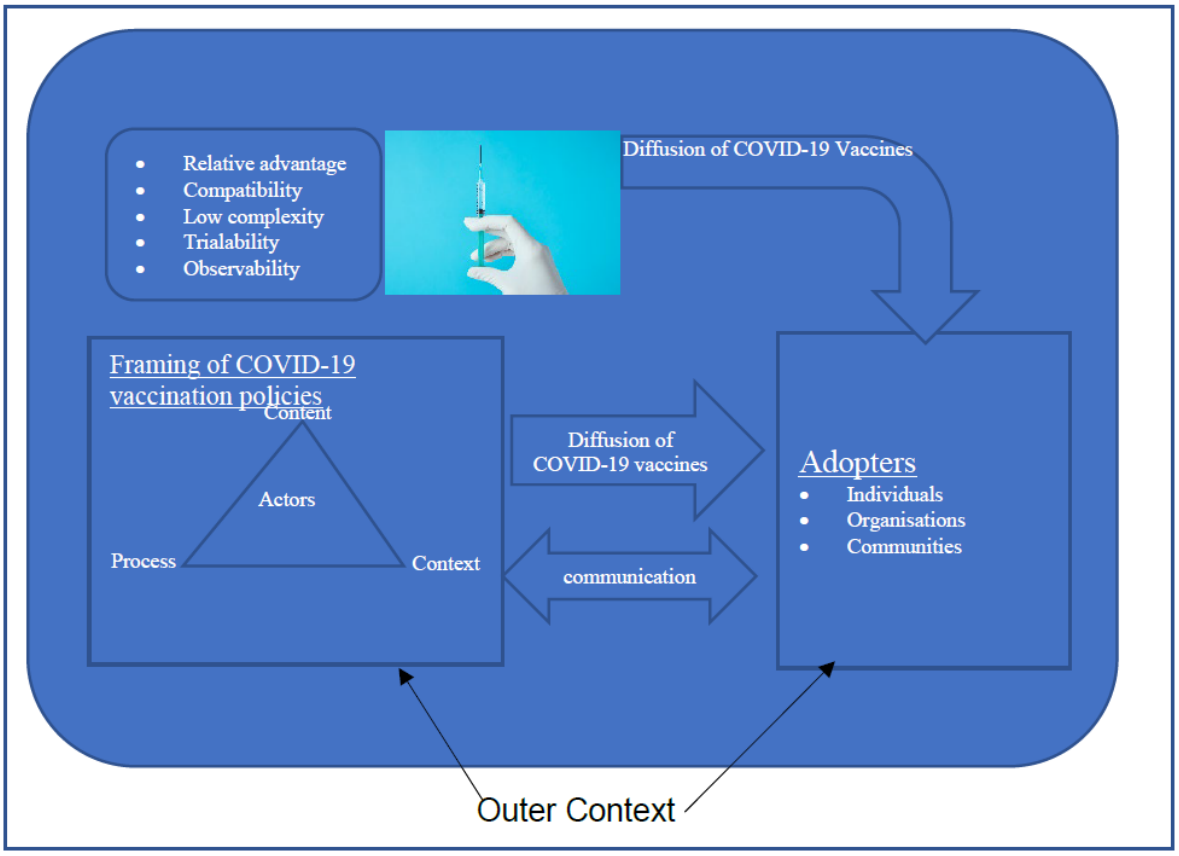
The purpose of the policy analysis was to understand why and how governments enacted and communicated COVID-19 vaccination polices in specific contexts for specific groups of the public in the East Midlands region in England (UK) and in the southwest of the province of Ontario in Canada. We used these two regions as exemplars of how policy could be both implemented and experienced at a national, regional, and local level. Specifically, we used both the policy triangle framework and a framing analysis to analyse how various actors interacted to formulate and communicate specific COVID-19 related policies. The policy triangle framework categorizes policy elements into contents, processes, actors and contexts.[33] The policy triangle highlights how policies are the embodiment of interactions between public and private actors. Therefore, analysing policy through the policy triangle framework offers an opportunity to examine a broad range of policy actors who participate in the process of policy making, including individuals, organisations, groups and government entities. Similarly, policy contents can be described according to both their detailed constituent parts and their intended objectives. Policy contexts can be described according to the systematic political, social economic and cultural level factors that affect the policy. And finally, the policy processes can be characterized according to how policies were initiated, formulated, negotiated and communicated.[34] Thus, the policy triangle is useful for organizing a policy analysis and considering how policies are formed, influenced, enacted, and modified.

A framing analysis, in contrast, is a constructivist and interpretivist approach to policy analysis that can be used to make sense of how and why policies are made and changed over time. A frame is a central organising idea for a particular knowledge scheme that can provide insights into unfolding events.[35] In this study, we used a framing analysis in two ways. First, we broadly categorized the central idea for each policy reviewed. Second, we identified case studies from the policy triangle analysis to examine more closely how different actors framed policies over time. We selected case studies that highlighted critical policy junctures in the COVID-19 vaccine policy rollout in either England, Ontario, or in both jurisdictions. As this was a multiple methods study, the UK and Canada team jointly identified cases that represented dominant themes from both the policy triangle analysis and the qualitative interviews (described in Chapter 3). After identifying the cases, we re-examined the relevant

[33] Walt et al., ''Doing'health policy analysis: methodological and conceptual reflections and challenges'; Buse et al., *Making health policy*.
[34] Walt et al., ''Doing'health policy analysis: methodological and conceptual reflections and challenges'; Buse et al., *Making health policy*.
[35] A. D. Koon et al., 'Framing and the health policy process: a scoping review', *Health policy and planning*, 31, 6 (2016), 801-816.

policies for evidence of how the policies were shaped, interpreted and communicated. Figure 2 summarises the theoretical framing of our research approach.

Figure 2: Summary of theoretical framing of the research



2.1.1. Data sources

The analysis was based on a desk review of online government policy documents for COVID-19 vaccination. To identify relevant policies for the period between March 2020 and December 2021, we searched official government websites and social media pages using the search terms “vaccinations for coronavirus” or “COVID jab” or “COVID-19 vaccination” or “jab” and “guidance” or “regulations” or “news” or “communications” or “policy papers” or “consultations” or “transparency and freedom of information” or “statement” or “information”. Operational policy documents, guidelines, laws, communications, statements and regulations were identified from the search. We did not search for or include search results posted outside of the official government channels, such as commentaries from experts who were not recognised as official government policy on the government website. The results of the search were indexed into a Mendeley database (UK) and ProQuest Refworks (Canada). We extracted data from the search results and inserted them into a spreadsheet using a data collection guide. The guide captured data on the date of policy initiation, enactment or communication; the detailed policy narrative and source (for example, parliamentary statement, press release, guideline, directive or law) and policy communicator. This dataset was then analysed further as described below.

2.1.2. Data analysis

Our policy analysis followed three stages. First, to structure our analysis and policy discussion, policy categories were derived based on issues that were being discussed (framed) in the policies and the processes that were undertaken to enact the policies. We reviewed the data captured in the aforementioned spreadsheet and coded (labelled) and organized them according to policy target populations, actors involved, intended policy objectives and communication channels. We then structured the codified data according to the domains of the policy triangle organised along a timeline (before, during and after approval of COVID-19 vaccines). We further organised the "policy contents" domain into three categories: i) prioritisation of specific groups of the population for vaccination during the pandemic, ii) vaccination schedules, iii) vaccine mandates, certificates or passports. We then generated chronological narratives of COVID-19 vaccination policy positions taken by the government during the pandemic response, ranging from the national level to the regional and local level in East Midlands and Ontario. Insights informed by the framing analysis of the two case studies enriched our chronological narratives. Finally, we combined our policy and qualitative findings (described further below) to gain additional insights into the equitability and coordination of COVID-19 vaccination response throughout the pandemic. Some policies were available as both press releases and policy documents. However, press releases were not used for the policy triangle analysis. Rather, they were examined for the framing analysis to explore how different actors communicated the central organizing idea of the policy.

2.2. Findings

The findings are presented according to the domains of the policy triangle framework, including policy processes, content and context, and actors involved in the communication of policies. We use case studies to demonstrate how different policy processes led to enactment of different policies in different contexts and how the interaction between various actors in different contexts led to the formulation of different policies.

2.2.1. COVID-19 vaccine policy processes

In this section we discuss the policy actions undertaken and by whom in both the UK and Canada before, during and after COVID-19 vaccine approval in each country. We use a case study on AstraZeneca to demonstrate how policy actors reviewing similar data in different contexts enacted different policies.

2.2.1.1. Pre-vaccine approval

2.2.1.1.1. Establishing a vaccine task force

As the world raced for effective vaccines, the UK and Canada invested significantly in vaccine research and development. These activities were aimed at ensuring that there

would be enough vaccine doses for the whole population, should an effective vaccine become available. To support these efforts, each country formed a Vaccine Task Force (VTF) in April 2020. The VTFs were comprised of interdisciplinary experts meant to expedite and coordinate efforts to identify and produce COVID-19 vaccines. The mandates for each VTF were broadly similar (Table 1), but while the Canadian VTF mandate focused exclusively on domestic vaccination policy, the UK VTF had an additional goal of supporting global distribution of vaccines.[36]

Table 1: Mandates of the Vaccine Task Forces in UK and Canada

United Kingdom	Canada
• support the discovery of potential coronavirus vaccines by working with the public and private sector, rapidly mobilising funding, supporting leading academics and identifying ways to fast-track clinical trials • prepare the UK as a leader in clinical vaccine testing and manufacturing, working with companies already at the forefront of vaccine development • review government regulations to facilitate rapid and safe vaccine trials and approval. • develop funding and operational plans for the procurement and delivery of vaccines. • build on the UK's research and development expertise to support international efforts to find a coronavirus vaccine.	• prioritise vaccine projects seeking support for activities in Canada. • attract to Canada promising non-Canadian vaccine candidates, or partner with developers of non-Canadian vaccine candidates • optimize the tools needed to develop vaccines. • support effective research and development, and supply chain coordination for COVID-19 vaccine projects. • facilitate solutions to manufacture the most promising COVID-19 vaccines in Canada. • identify opportunities to enhance business connectivity globally to secure access to vaccines with key commercial sponsors.

2.2.1.1.2. Securing early access to vaccine stocks

In the early months of the pandemic, the UK started to expand its vaccine manufacturing capacity by investing in manufacturing plants. It also secured several advance purchase agreements with vaccine manufacturers.[37] Meanwhile in Canada, a ramp-up of vaccine production facilities in Canada was not feasible as there were no large-scale vaccine manufacturing industries in the country. Thus, the government announced plans to establish manufacturing capacity post-pandemic but focused heavily on establishing advanced purchase agreements for vaccines from global partners.[38] The procurement of vaccine in the UK was coordinated by the VTF, in line with civil processes. In Canada, Public Services and Procurement Canada (PSPC)

[36] E. I. S. Department for Business **Reference type not supported**; Department for Business Energy & Industrial Strategy et al. **Reference type not supported**; National Research Council Canada **Reference type not supported**

[37] Department for Business Energy & Industrial Strategy et al. **Reference type not supported**; Department for Business Energy & Industrial Strategy & The Rt Hon Alok Sharma MP **Reference type not supported**

[38] Public Services Procurement Canada **Reference type not supported**

worked with the Public Health Agency of Canada (PHAC), Health Canada and Innovation, Science and Economic Development Canada (ISED) to identify and procure vaccines and supplies, with the guidance of the VTF.

2.2.1.1.3. Amending regulations to ensure quick approval of new vaccines

As the prospects of obtaining an effective vaccine began to emerge, the UK government conducted a consultative process to amend the Human Medicine Regulations, established in 2012. The amendment aimed to reinforce safeguards to allow the Medicines and Health Regulatory Agency (MHRA) to grant a temporary authorisation for the use of a new COVID-19 vaccine before full vaccine licences were granted, providing the highest safety and quality standards were met. The amendment also temporarily expanded the definition of who could administer a COVID-19 or influenza vaccination to include other well trained non-usual vaccinators and offered clarity on the scope of the protection from civil liability for the temporarily expanded list of vaccinators.[39]

Canada followed a similar process in preparing for vaccine approval. In October 2020, prior to the approval of COVID-19 vaccines, the Canadian government approved an interim order that temporarily amended the Food and Drugs Act to allow manufacturers to expedite the approval of drugs and vaccinations for the prevention or treatment of COVID-19.[40] The interim order maintained the standard requirements for efficacy and safety needed for regulatory approval but allowed data to be reviewed by the regulatory body Health Canada in advance of the final submission for approval. The interim order also allowed “pre-positioning,” where the manufacturer could import the drug or vaccine ahead of approval and place it in Canadian facilities to be distributed quickly as soon as approval was granted.

2.2.1.1.4. Developing interim prioritisation guidelines

In preparation for vaccine approval, both countries released interim criteria for vaccination prioritisation of a COVID-19 vaccine. The UK released an interim plan for prioritisation as early as July 2020. The interim plan prioritised frontline health and social care workers and stratified those at increased risk of serious disease and death by age and risk factors. The prioritisation advice issued by the Joint Committee on Vaccinations and Immunisation (JCVI) was framed as giving direct protection of individuals and mitigating health inequalities, while giving due consideration to ethical principles. Although it was noted that Black, Asian and minority ethnic (BAME) groups experienced higher rates of infection and higher rates of serious disease, morbidity

[39] Department of Health & Social Care, *New measures to support development of safe COVID-19 vaccines for UK - GOV.UK*, 2020. Available online: https://www.gov.uk/government/news/new-measures-to-support-development-of-safe-covid-19-vaccines-for-uk [Accessed.

[40] Government of canada, *Interim Order Respecting the Importation, Sale and Advertising of Drugs for Use in Relation to COVID-19*, 2021. Available online: https://covidlawlab.org/wp-content/uploads/2021/04/Canada_2021-01-29_Order_Interim-Order-Respecting-the-Importation-Sale-and-Advertising-of-Drugs-for-Use-in-Relation-to-COVID-19_EN.pdf [Accessed Feb 26].

and mortality, no evidence suggested that ethnicity by itself or genetics was the cause of these discrepancies. The available evidence suggested that certain health conditions associated with increased risk of disease were overrepresented in the BAME communities. Therefore, implementers were directed to identify inequalities and subsequently address them through culturally competent, tailored communications and flexible delivery models that were to be applied across all priority groups.[41]

In October 2021, Canada's National Advisory Committee on Immunization (NACI) also released preliminary criteria for the prioritisation of populations for vaccination. Canada's devolved healthcare system meant individual provinces and territories were responsible for developing their own prioritization lists. In Ontario, the Vaccine Distribution Task Force followed the NACI guidance by developing an interim vaccination plan. It included those at high risk of severe illness and death from COVID-19 (advanced age and high-risk health conditions); those most likely to transmit the virus to those at high risk of severe illness and death from COVID-19; those who were essential to maintaining the COVID-19 response (health workers, carers for elders and household contacts of those at risk); those contributing to the maintenance of essential services such as police; those at high risk of infection owing to living or working conditions; and people based in settings where infection could lead to disproportionate consequences, such as Indigenous communities. Prioritisation of Indigenous communities in the interim plan was based on those communities having been disproportionately impacted by past pandemics (such as the 2009 H1N1 influenza pandemic) and the need for special consideration of issues related to equity, feasibility and acceptability. The prioritisation guidance was framed within the ethical principles of respect for persons and communities, beneficence and non-maleficence, justice and trust.[42]

2.2.1.2. Processes during vaccine approval

In the UK, when a pharmaceutical company seeks approval for a vaccine, the company submits its clinical trials data to the Department of Health and Social Care (DHSC), which requests that the MHRA assess the data for vaccine safety and effectiveness. Once a vaccine is found to meet the highest safety and effectiveness criteria, the MHRA, with advice from the Commission on Human Medicine (CHM), recommends that the government approve the vaccine. On approval, the JCVI advises the government on how the vaccine should be used in the UK, based on the best evidence available. During the COVID-19 pandemic, due to the public health emergency setting, the laws were amended to allow the regulators to conduct "rolling review" of data for promising vaccine candidates that could be reviewed as they

[41] Department of Health & Social Care, *[Withdrawn] Joint Committee on Vaccination and Immunisation: interim advice on priority groups for COVID-19 vaccination.*, 2020. Available online: https://www.gov.uk/government/publications/priority-groups-for-coronavirus-covid-19-vaccination-advice-from-the-jcvi/interim-advice-on-priority-groups-for-covid-19-vaccination [Accessed.

[42] {National Advisory Committee on Immunization, 2020 #48

became available.[43] In the amended process, the JCVI was still responsible for providing advice on how vaccines should be used, but the UK Health Security Agency (UKHSA) was now responsible for rapidly translating these recommendations into guidance and promotion materials for health workers and the public.[44]

In Canada, in a process identical to the UK, the Interim agreement that had amended the Food and Drugs Act fast-tracked the approval processes by allowing manufacturers to submit data for Health Canada on a rolling basis. Experts from NACI were also given earlier access. Health Canada approved the vaccines once the vaccines were found to meet requirements for efficacy and safety.[45] NACI rapidly released guidance statements for use, which were communicated through the Public Health Agency of Canada (PHAC). However, unlike the UK, Canada's system had another layer. After approval by Health Canada and guidance by NACI, each province and territory made its own policy for how the vaccine would be made available.

2.2.1.3. Processes after the approval of vaccines

Following translation of regulations around COVID-19 vaccination into guidelines, the UK government laid out an ambitious vaccination plan that would see everyone in the top four most vulnerable groups offered their first vaccine dose by mid-February 2021. The aim of the plan was framed as saving as many lives as quickly as possible, reducing hospitalisations and reliving pressure on the National Health Service (NHS). The vaccine deployment plan was intended to be a collaborative effort between the NHS, Armed Forces, and local and regional government. A post-implementation surveillance plan for COVID-19 vaccines in England was also developed to monitor vaccine uptake (coverage), vaccine effectiveness, population impact and vaccine safety. Specifically, the plan required ongoing surveillance by independent health organisations (UKHSA for England), not associated with vaccine producers, to maintain public and healthcare professional confidence in the vaccine and support vaccine policy efforts.[46]

The UKHSA supported the NHS to ensure smooth deployment of the vaccine programme by publishing relevant practical guidelines each time a new policy on vaccination was released by the JCVI. The UKHSA regularly updated the chapter in the "Green Book" on immunisation against infectious diseases, a vital guide for

[43] {Department of Health and Social Care, 2020 #46}
[44] PHE, *PHE publishes COVID-19 vaccine guidance for health and social care workers - GOV.UK*, 2020. Available online: https://www.gov.uk/government/news/phe-publishes-covid-19-vaccine-guidance-for-health-and-social-care-workers [Accessed.
[45] Government of Canada, *Vaccine development and approval in Canada - Canada.ca*, 2021. Available online: https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/drugs-vaccines-treatments/vaccines/development-approval-infographic.html [Accessed.
[46] Department of Health & Social Care, *UK COVID-19 vaccines delivery plan - GOV.UK*, 2021. Available online: https://www.gov.uk/government/publications/uk-covid-19-vaccines-delivery-plan [Accessed; Department of Health & Social Care & The Rt Hon Nadhim Zahawi MP, *A vaccine delivery plan for everyone - GOV.UK*, 2021. Available online: https://www.gov.uk/government/speeches/a-vaccine-delivery-plan-for-everyone [Accessed.

professionals administering vaccines in the UK.[47] However, during the implementation of the vaccination programme, more powers were given to local NHS organisations on a case-by-case basis to improve service delivery. Specifically, the JCVI recommended flexibility in vaccine deployment at a local level with due attention to mitigating health inequalities, such as might occur in relation to access to healthcare and ethnicity, exceptional individualised circumstances and availability of suitable approved vaccines, for example, for specific age cohorts.[48]

On the other hand, Canada with greater devolution of powers, had a slightly more complex vaccine rollout involving both federal government and provincial/territorial actors. PHAC published an immunisation plan aimed at "saving lives and livelihoods" in December 2020. The goal of the plan was "to enable as many Canadians as possible to be immunized as quickly as possible against COVID-19, while ensuring that high risk populations are prioritised".[49] The federal government procured the vaccines, PHAC worked with the Canadian Armed Forces to distribute the vaccines and vaccination supplies, and the provinces and territories were responsible for deploying the vaccines in their jurisdictions. All levels of government also worked with Indigenous (First Nations, Inuit, and Métis) partners to distribute vaccines. Simultaneously, Health Canada reassured provincial governments that post-vaccine surveillance would be conducted to monitor the safety and effectiveness of COVID-19 vaccines [50]. The Canadian government also established a no-fault vaccine injury support programme.[51]

Looking at the rollout in Ontario, very limited supply of the novel Pfizer vaccine meant that the first shipments were distributed in Ontario only to two hospital sites in the largest urban centre.[52] Once larger quantities of both Pfizer and Moderna were available, COVID-19 distribution was expanded to hospitals in regions with the highest rates of COVID-19 infections.[53] In preparation for a larger vaccine supply, the Ontario government also amended legislation to allow nurses, pharmacists, pharmacy technicians and pharmacy students to administer the vaccine. Later with more vaccine availability, the distribution effort was expanded to mobile teams for long-term care,

[47] PHE, *PHE publishes COVID-19 vaccine guidance for health and social care workers - GOV.UK.*
[48] Department of Health & Social Care, *UK COVID-19 vaccines delivery plan - GOV.UK.*
[49] Government of Canada, *Canada's COVID-19 Immunization Plan: Saving Lives and Livelihoods.*, 2020. Available online: https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/canadas-covid-19-immunization-plan.html [Accessed.
[50] Public Health Agency of Canada, *Role of the National Advisory Committee on Immunization (NACI) in COVID-19 Vaccine Planning*, 2021. Available online: https://nccid.ca/wp-content/uploads/sites/2/2021/02/Foundations2_NACI_Role.pdf [Accessed.
[51] Public Health Agency of Canada, *Government of Canada Announces pan-Canadian Vaccine Injury Support Program - Canada.ca*, 2020. Available online: https://www.canada.ca/en/public-health/news/2020/12/government-of-canada-announces-pan-canadian-vaccine-injury-support-program.html [Accessed.
[52] Office of the Premier, *Ontario Begins Rollout of COVID-19 Vaccine*, 2020. Available online: https://news.ontario.ca/en/release/59607/ontario-begins-rollout-of-covid-19-vaccine [Accessed December 11].`
[53] Chief Medical Officer of Health, *Ontario Expands COVID-19 Vaccine Locations* 2020. Available online: https://news.ontario.ca/en/release/59753/ontario-expands-covid-19-vaccine-locations [Accessed December 18].

congregate living facilities and mass immunisation clinics.[54] In addition, supply logistics were tested in Northern Ontario to reach Indigenous and remote communities.[55]

2.2.1.4. Complex policy processes - the AstraZeneca case study

In March 2021, global concerns about the AstraZeneca COVID-19 vaccine arose and several European countries suspended its use. This was in the context of an ongoing investigation as to whether a rare specific type of blood clot in the cerebral veins (cerebral venous sinus thrombosis or CVST) occurring together with lowered platelets (thrombocytopenia), which can also occur naturally, was indeed caused by the AstraZeneca vaccine.[56] Through this case study, we will demonstrate that even though Canada and the UK had access to the same scientific evidence before, during and after approval of the AstraZeneca vaccine, the two countries had different policy responses (Boxes 1 and 2). The variation can be attributed to differences in the framing of risk, safety, effectiveness and protection offered.

The UK case study [57]shows that the UK policy response aimed to gain as much protection as possible in the public in the shortest possible time. Thus, a risk/benefit framing was used to come to the decision to continue using AstraZeneca. It can be argued that if AstraZeneca was the only vaccine left, its use would not have been halted based on the estimated four in a million risk at that time. Nevertheless, efforts were made to halt the use of AstraZeneca completely in the groups where the risk was assessed to be higher such as those with a history of blood clots.

[54] Chief Medical Officer of Health, *Nurses (RN/RPN) – Province Wide - COVID-19 mRNA Vaccination Order* 2021. Available online: https://www.health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/orders/OrderS5_Nurses_2021_02_05.pdf [Accessed February 5]; Ontario Pharmacists Association, *COVID-19 Vaccine Administration* 2021. Available online: https://opatoday.com/covid-19-vaccine-administration/ [Accessed January 14].

[55] Chief Medical Officer of Health, *Ontario Accelerates COVID-19 Vaccinations for Long-Term Care Homes in Priority Regions* 2021. Available online: https://news.ontario.ca/en/release/59871/ontario-accelerates-covid-19-vaccinations-for-long-term-care-homes-in-priority-regions [Accessed January 05].

[56] J. Wise **Reference type not supported**

[57] Department of Health & Social Care, *Statement on AstraZeneca COVID-19 vaccine following JCVI update.*, 2021. Available online: https://www.gov.uk/government/news/statement-on-astrazeneca-covid-19-vaccine-following-jcvi-update [Accessed; Department of Health & Social Care, *Statement on AstraZeneca COVID-19 vaccine following MHRA update.*, 2021. Available online: https://www.gov.uk/government/news/statement-on-astrazeneca-covid-19-vaccine-following-mhra-update [Accessed; Medicines and Healthcare Products Regulatory Agency, *UK regulator confirms that people should continue to receive the COVID-19 vaccine AstraZeneca.*, 2021. Available online: https://www.gov.uk/government/news/uk-regulator-confirms-that-people-should-continue-to-receive-the-covid-19-vaccine-astrazeneca [Accessed; Department for Business Energy and Industrial Strategy, *UK Vaccine Taskforce 2020 Achievements and Future Strategy*, 2020. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1027646/vtf-interim-report.pdf [Accessed December].

Box 1: UK's policy response following rare AstraZeneca related blood clots

One of the mandates of the Vaccine Task Force (VTF) created during the COVID-19 pandemic was to strengthen the UK's onshoring capacity and capability in vaccine development, manufacturing, and supply chain to provide resilience for future pandemics. One result of the efforts of the VTF was the Oxford/AstraZeneca vaccine that was developed by the University of Oxford. The vaccine was approved after rigorous scientific review by the Medicines and Healthcare products Regulatory Agency (MHRA). In addition to the home-grown vaccine, the UK worked to secure vaccine doses of all promising vaccine candidates.

Following global concerns of rare blood clots, the UK continued to ask people to get vaccinated based on advice from the MHRA. However, as a precaution, the government advised that people below the age of 30 with no known predisposing conditions for blood clots would be given an alternative vaccine where possible. When the link between AstraZeneca and thrombocytopenia became clearer, the MHRA argued that the benefits of vaccination outweighed the risks that were estimated to be four in a million people given the vaccine. The MHRA did not recommend any age restrictions but issued guidance to health providers on how to minimise the risk. Following this updated advice from the MHRA, the JCVI issued a statement that people under 40 should receive an alternative vaccine (Pfizer or Moderna) as long as this did not cause substantial delays in vaccination. The government's reassurance of the public was constantly framed around the risk/benefit of receiving the vaccine in a time when virus risk was high and vaccines were scarce.

Some polices are stable, while others are undergo several changes before they stabilise.[58] The Canadian AstraZeneca COVID-19 policy response [59] is a clear

[58] Walt et al., ''Doing'health policy analysis: methodological and conceptual reflections and challenges'.
[59] Government of Canada, *COVID-19 vaccination requirement for federal public servants - Canada.ca*, 2021. Available online: https://www.canada.ca/en/government/publicservice/covid-19/vaccination-public-service/vaccination-requirements.html [Accessed; h. d. Ministry of & d. devices **Reference type not supported**; Health Canada, *Health Canada provides update on safety review of AstraZeneca and COVISHIELD COVID-19 vaccines* 2021. Available online: https://www.canada.ca/en/health-canada/news/2021/04/health-canada-provides-update-on-safety-review-of-astrazeneca-and-covishield-covid-19-vaccines.html [Accessed April 14]; National Advisory Committee on Immunization, *Recommendations on the use of COVID-19 vaccines [2021-03-16]*. 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines/march-16-2021.html#appc [Accessed March 16]; National Advisory Committee on Immunization, *National Advisory Committee on Immunization (NACI): Summary of updated vaccine statement of March 16, 2021*, 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines/summary-updated-statement-16-march-2021.html [Accessed March 1]; National Advisory Committee on Immunization, *Archived 11: Summary of National Advisory Committee on Immunization statement of May 28, 2021.*, 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines/summary-updated-statement-may-28-2021.html [Accessed; National Advisory Committee on Immunization, *Archived 13: Recommendation on the use of the Pfizer-BioNTech COVID-19 vaccine in adolescents 12 to 18 years of age [2021-05-18]*. 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendation-use-pfizer-biontech-covid-19-vaccine-adolescents.html [Accessed; Ontario government, *Ontario Safely Expands Age Eligibility for AstraZeneca COVID-19 Vaccine to 40+* 2021. Available online: https://news.ontario.ca/en/statement/61204/ontario-safely-expands-age-eligibility-for-astrazeneca-covid-19-vaccine-to-40 [Accessed April 19]; World Health Organization, *WHO lists two additional COVID-19 vaccines for emergency use and COVAX roll-out* 2021. Available online: https://www.who.int/news/item/15-02-2021-who-lists-two-additional-covid-19-vaccines-for-emergency-use-and-covax-roll-out [Accessed 15 February].

example of an unstable policy that is characteristic of complex policy decisions. It can be argued that Canadian policy makers might have not been able to consider the views of all actors at the same time to create a unified policy. Thus, the problem of blood clotting with the AstraZeneca vaccine could only have served as a trigger event for competing policy actors with varying interests and issues at hand, such as increased vaccination coverage, vaccine equity, mRNA brand loyalty and what degree of risk is ethically acceptable. For Canada, specifically Ontario, the framing around safety prevailed.

Box 2: Canada's response following rare AstraZeneca related blood clots

Previously a leading country in vaccine research and manufacturing, Canada gradually trimmed its domestic manufacturing capacity in favour of a globalised outsourcing approach in the decades leading to the COVID-19 pandemic. The outbreak of COVID-19 left Canada with no choice but to rely on procurement from other countries. Thus, Canada's COVID-19 vaccine response was framed around access to the most promising vaccine candidates developed elsewhere. Due to overwhelming global demand and scarcity of vaccines, Canada had to compete with other countries in securing early access to the vaccine.

The AstraZeneca vaccine gained global approval by the World Health Organization (WHO) when Canada was going through an Alpha variant driven wave that had resulted in spikes in hospital admissions. While the WHO and the European Medicines Agency (EMA) approved the AstraZeneca vaccine in January, Health Canada reviewed the safety and effectiveness and approved the vaccine a month later. Health Canada also had reservations on approving AstraZeneca in those aged 65 years and above due to limited efficacy data in the age group. Thus, NACI recommended the use of AstraZeneca in only adults aged 18-64 years. This was despite the high demand for the vaccine in older age groups. In a matter of a few days the NACI revised its recommendations to authorise use of AstraZeneca among older adults aged 65 and above, citing real-world data from the UK, whilst emphasising that mRNA vaccines should still be prioritised for individuals at high risk. This created confusion at the provincial and territorial level as there were no clear criteria for deciding who should get which vaccine. Concerns were raised as to whether there was such a thing as "better" vaccine in the context of scarcity.

Following global concerns over the association between AstraZeneca and rare blood clots that led to the suspension of the use of AstraZeneca in most European countries, NACI recommended suspension of its use in all adults under 55 years of age in Canada within a month of approval. However, after an independent review of the data by Health Canada concluded that the blood clots were indeed linked to AstraZeneca, no age restrictions were added to the vaccine's labelling. Provincial governments were tasked to make a case-by-case decision on the use of AstraZeneca based on local disease epidemiology, vaccine supplies and equality concerns. By mid-April the province of Ontario, through the Chief Medical Officer of Health, declared that the province would resume administering AstraZeneca, but only to those aged 40 and above.

Within a few weeks, provincial advisory groups, including the Ontario Science Table, estimated that the risk of blood clots could be as high as eight in a million, and then further increased the estimate to almost 37 per million. This higher risk motivated Ontario to halt the use of AstraZeneca. In the aftermath, people who had received AstraZeneca were praised by the Chief Medical Officer for having done the right thing protecting themselves their families and were encouraged to take an alternative mRNA vaccine for their second dose, resulting in mixed vaccine schedules. NACI, which had preferentially recommended mRNA vaccines over AstraZeneca, was heavily criticised for causing confusion and contributing to vaccine hesitancy. Early on, Health Canada and NACI framed their reluctance to recommend AstraZeneca around efficacy. Later, as the framing shifted to safety, the provinces were tasked with making much more complex decisions that weighed vaccine scarcity against local risks and benefits. In contrast to the UK's constant reassurance of risk vs benefit, the Canadian approach did not reassure the public. The AstraZeneca vaccine was ultimately abandoned in Canada in favour of alternative vaccines.

2.2.2. COVID-19 Vaccine policy content and context

The UK became the first country in the world to approve a COVID-19 vaccine by approving Pfizer/BioNTech's COVID-19 vaccine under temporary authorisation by the MHRA for use in adults aged 18 years and above on December 2, 2020. The UK's

portfolio of approved vaccines would gradually expand to include AstraZeneca, Moderna and Johnson & Johnson vaccines (in our study period up to December 2021). In a similar way, Canada approved the Pfizer vaccine on December 9, 2020, and developed an identical vaccine portfolio. In this section, we examine key COVID-19 vaccination policies that were communicated throughout the course of the pandemic to targeted groups. Our discussion of the policies is structured around three categories that were identified during data analysis, namely: (i) prioritisation of specific groups of the population for vaccination during the pandemic; (ii) vaccination schedules; (iii) vaccine mandates and the COVID-19 pass (certificate or passport). We further use case studies to demonstrate that although the two countries had access to the same vaccines and used similar scientific rationale to prioritise populations for vaccinations, their contexts led them to implemented different policies.

2.2.2.1. Prioritisation strategy of at-risk groups

2.2.2.1.1. Prioritisation for primary course of the vaccine

Following approval of the first vaccine, both countries acknowledged that initial supplies of authorized COVID-19 vaccines were not expected to be sufficient to offer vaccination to all who qualified.[60] To address the initial shortage of vaccines in the UK, the JCVI updated its advice and set out a framework for refining future advice, informing the national COVID-19 vaccination strategy. The first priority was the prevention of COVID-19 mortality and the protection of health and social care staff and systems. Secondary priorities included vaccination of those at increased risk of hospitalisation and at increased risk of exposure and to maintain resilience in essential public services. The advice was based on a number of data sets: a review of UK epidemiological data on the effect of the COVID-19 pandemic; data on demographic and clinical risk factors for mortality and hospitalisation from COVID-19; data on occupational exposure; vaccine development data; and data from reviews on inequalities.[61] Thus, the UK vaccination programme was to be rolled out in two phases according to the primary and secondary priorities (Table 2). Phase 1 was rolled out in December 2020. Data on the safety and effectiveness of COVID-19 vaccines for

[60] Joint Committee on Vaccination and Immunisation, *Advice on priority groups for COVID-19 vaccination, 30 December 2020 - GOV.UK*, 2021. Available online: https://www.gov.uk/government/publications/priority-groups-for-coronavirus-covid-19-vaccination-advice-from-the-jcvi-30-december-2020/joint-committee-on-vaccination-and-immunisation-advice-on-priority-groups-for-covid-19-vaccination-30-december-2020#vaccine-priority-groups-advice-on-30-december-2020 [Accessed; National Advisory Committee on Immunization, *Archived: Guidance on the prioritization of key populations for COVID-19 immunization [2021-02-12] - Canada.ca*, 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/guidance-prioritization-key-populations-covid-19-vaccination.html [Accessed; Public Health England, *JCVI issues interim advice on Phase 2 of COVID-19 vaccination programme rollout - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/jcvi-issues-interim-advice-on-phase-2-of-covid-19-vaccination-programme-rollout [Accessed.

[61] Department of Health & Social Care, *Letter from UK health ministers to UK CMOs on COVID-19 vaccination of 12 to 15 year olds - GOV.UK*, 2021. Available online: https://www.gov.uk/government/publications/letter-from-uk-health-ministers-to-uk-cmos-on-covid-19-vaccination-of-12-to-15-year-olds [Accessed; Joint Committee on Vaccination and Immunisation, *Advice on priority groups for COVID-19 vaccination, 30 December 2020 - GOV.UK.*

groups that were at lower risk of mortality were expected to become available as Phase 1 was being rolled out and would inform Phase 2. In mid-April 2021, the UK government announced that it would progress to Phase 2 of the vaccination programme, with people aged 45 to 49 years being invited to book their appointments.[62] This followed advice from the JCVI setting out that the most effective way to minimise hospitalisations and deaths was to prioritise people by age. It was also presumed that an age-based programme would likely result in faster delivery and better uptake in those at the highest risk compared to other forms of prioritisation. The decision was based on data indicating that in individuals aged 18 to 49 years there was an increased risk of hospitalisation in males, those who were in certain Black, Asian or ethnic minority communities, those with a BMI of 30 or more (obese/morbidly obese) and those experiencing socio-economic deprivation.[63] Thus, adults aged 18 to 49 years were to be prioritised in the following descending age order. The prioritisation groups are summarised in Table 2.

The Canadian prioritization framework, by comparison, was far more complicated than the UK's age-based framework. Canada anticipated having a much more limited vaccine supply and within a framing of scarcity, NACI developed a guidance for a phased vaccine rollout. However, Canada's devolved health system meant that each province and territory was responsible for using NACI's guidance to develop its own prioritization lists. NACI initially identified four priority groups: (i) residents and staff of congregate living facilities that care for seniors; (ii) older adults beginning with adults aged 80+ and moving down in five-year increments; (iii) healthcare workers; and (iv) adults living in Indigenous communities.[64] Indigenous communities were prioritised based on the disproportionate impact of past pandemics, such as the 2009 H1N1 influenza pandemics, and due to limited access to health care in remote communities. NACI also recognized that "racialised and marginalized populations" that face systemic barriers such as poverty, racism and homelessness could be considered alongside the prioritisation of Indigenous communities. The prioritisation guidance was framed within the ethical principles of respect for persons and communities, beneficence, non-maleficence, justice and trust.[65]

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[62] Department of Health & Social Care, *UK moves into next phase of vaccine roll-out as government target hit early - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/uk-moves-into-next-phase-of-vaccine-roll-out-as-government-target-hit-early [Accessed.

[63] Department of Health & Social Care, *Advice on phase 2 of the COVID-19 vaccination programme: DHSC statement - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/advice-on-phase-2-of-the-covid-19-vaccination-programme-dhsc-statement [Accessed; JCVI, *JCVI final statement on phase 2 of the COVID-19 vaccination programme: 13 April 2021 - GOV.UK* (DHSC, 2021). Available online: https://www.gov.uk/government/publications/priority-groups-for-phase-2-of-the-coronavirus-covid-19-vaccination-programme-advice-from-the-jcvi/jcvi-final-statement-on-phase-2-of-the-covid-19-vaccination-programme-13-april-2021 [Accessed.

[64] National Advisory Committee on Immunization, *Archived: Guidance on the prioritization of key populations for COVID-19 immunization [2021-02-12] - Canada.ca*.

[65] S. J. Ismail et al., 'Key populations for early COVID-19 immunization: preliminary guidance for policy', *Cmaj*, 192, 48 (2020), E1620-E1632; National Advisory Committee on Immunization, *Archived: Guidance on the prioritization of key populations for COVID-19 immunization [2021-02-12] - Canada.ca*.

In Ontario, the Vaccine Distribution Task Force was established to plan for the prioritization and logistical delivery of vaccinations in the province. Following NACI's broad initial guidance, Ontario's provincial task force identified and organized risk groups into six priority categories: 1) those at high risk of severe illness and death from COVID-19 (advanced age and high-risk health conditions); 2) those most likely to transmit the virus to those at high risk of severe illness and death from COVID-19; 3) those who were essential to maintaining the COVID-19 response (health workers, carers for elders and household contacts of those at risk); 4) those contributing to the maintenance of essential services, such as first responders and police; 5) those at high risk of infection owing to living or working conditions; 6) and those based in settings where infection could lead to disproportionate consequences such as Indigenous communities. The province's Phase 1 prioritization followed the NACI guidance closely, focusing on congregate living facilities, healthcare workers, adults over age 80 and Indigenous (First Nations, Métis and Inuit) populations. Phase 2 included people who live in hotspot communities, which allowed for prioritization of marginalized communities, including the use of postal codes to identify neighbourhoods with high rates of COVID-19 illness, hospitalisation, and death.[66]

At first glance, the UK and Canada had similar prioritisation strategies that established phases based on disease epidemiology and socio-demographic factors, such as age. They aimed to protect people at highest risk of severe outcomes. However, the countries addressed racialised and marginalized communities in strikingly different ways. Canada prioritised Indigenous communities and even explicitly cited "systemic racism" as a reason to prioritise marginalised and racialised communities.[67] On the other hand, the UK acknowledged the disproportionate effects of COVID-19 on racialised groups but refrained from prioritising them. Instead, the UK opted for a simpler age-based strategy.[68]

[66] Government of Ontario, *Ontario's COVID-19 vaccination plan | COVID-19 (coronavirus) in Ontario*, 2020. Available online: https://covid-19.ontario.ca/ontarios-covid-19-vaccination-plan#our-three-phased-vaccination-plan [Accessed.

[67] National Advisory Committee on Immunization, *Archived: Guidance on the prioritization of key populations for COVID-19 immunization [2021-02-12] - Canada.ca*.

[68] Joint Committee on Vaccination and Immunisation, *Advice on priority groups for COVID-19 vaccination, 30 December 2020 - GOV.UK*.

Table 2: Comparison of planned vaccine rollout phases for Canada, Ontario and the UK

	Ontario	Canada	United Kingdom
Phase 1	Dec 2020 – Mar2021	Dec 2020- Mar 2021	Dec 2020- April 2021
	1. Congregate living for seniors 2. Health care workers 3. Adults in First Nations, Métis and Inuit populations 4. Adult chronic home care recipients 5. Adults ages 80 and older	1. Residents and staff of congregate living settings that provide care for seniors 2. Adults 70 years of age and older, beginning with adults 80 years of age and older, then decreasing the age limit by 5-year increments to age 70 years as supply becomes available 3. Frontline health care workers (including those who work in health care settings and personal support workers with direct contact with patients) 4. Adults in Indigenous communities where infection can have disproportionate consequences	1. Residents in a care home for older adults and their carers 2. All those 80 years of age and over and frontline health and social care workers 3. All those 75 years of age and over 4. All those 70 years of age and over and clinically extremely vulnerable individuals 5. All those 65 years of age and over 6. All individuals aged 16 years to 64 years with underlying health conditions which put them at higher risk of serious disease and mortality 7. All those 60 years of age and over 8. All those 55 years of age and over 9. All those 50 years of age and over
Phase 2		April 2021- June 2021	April 2021-on wards
	1. Adults aged 55 and older, in decreasing increments 2. High-risk congregate settings (such as shelters, group homes) 3. Individuals with certain health conditions 4. Certain essential caregivers 5. People who live in hot spot communities 6. Those who cannot work from home	1. Adults in or from Indigenous communities not offered vaccine in Stage 1 2. Residents and staff of other congregate living settings (e.g., quarters for migrant workers, shelters) 3. Adults 60-69 years of age, beginning with ≥65 years, then decreasing age limit to 60 years 4. Adults in racialised and marginalized communities disproportionately affected by COVID-19 5. First responders (e.g., police, firefighters) 6. Frontline essential workers who cannot work virtually (direct, close physical contact with the public) 7. Essential primary caregivers for individuals who are at high risk of severe illness from COVID-19 due to advanced age	1. All those aged 40 to 49 years 2. All those aged 30 to 39 years 3. All those aged 18 to 29 years
Phase 3		From June onwards	Not applicable
	All remaining eligible Ontarians	1. Individuals aged 16-59 years of age with an underlying medical condition 2. Adults 50-59 years without an underlying medical condition beginning with ≥55 years then decreasing age limit to 50 years 3. Non frontline health workers required to maintain health capacity	

2.2.2.1.2. Prioritisation of pregnant women

Both the UK and Canada followed a precautionary approach for vaccination in pregnancy, limiting the initial approval to pregnant people at highest risk and later expanding the recommendation to align with the general population. For example, in

the UK, the MRHA first approved the vaccines with a precautionary statement that the vaccines should only be used in pregnancy and breastfeeding when benefits outweigh risks. The JCVI encouraged pregnant people to discuss vaccination with their healthcare professional.[69] Similarly, NACI initially stated that the vaccine could be offered in pregnancy "on a case-by-case basis, if the benefits outweighed the risks and with transparency about the limited evidence available". Both the JCVI and NACI later revised their statements as more evidence emerged that the vaccines were likely safe in pregnancy,[70] bringing the recommendations in line with the general recommendations based on age and other risk factors.[71]

2.2.2.1.3. Prioritisation of adolescents 12 to 17 years

By December 9, 2020, Health Canada had approved the use of Pfizer-BioNTech COVID-19 vaccine for people aged 16 years and older, allowing the early vaccination of teens aged 16 and 17. Canada was also one of the first countries in the world to authorise the Pfizer vaccine for children aged 12-15 years in May 2021, following a review by Health Canada. However, Health Canada placed conditions on the authorization requiring Pfizer-BioNTech to continue providing information on efficacy and safety in teens. Prior to the authorization, NACI had made a discretionary recommendation on the use of Pfizer in adolescents 12 to 15 years of age for select high-risk groups, as they were included in limited numbers in the original clinical trial. Immediately after the approval, NACI recommended that the vaccine should be offered to all adolescents aged 12 to 18 who did not have contraindications to the vaccine. They latter updated the advice in August 2021 to include the recommendation to discuss the risk of myocarditis in the context of risk of the virus.[72]

Case study: UK prioritisation of adolescents aged 12-17 years

In this case study we demonstrate that although the UK and Canada had similar access to vaccine manufacturers' efficacy and safety data for children and young people, each country made different choices when deciding whether to recommend vaccination for teens.

[69] Medicines and Healthcare Products Regulatory Agency, *Oxford University/AstraZeneca COVID-19 vaccine approved.*, 2020. Available online: https://www.gov.uk/government/news/oxford-universityastrazeneca-covid-19-vaccine-approved [Accessed.

[70] National Advisory Committee on Immunization, *Archived 11: Summary of National Advisory Committee on Immunization statement of May 28, 2021.*

[71] PHE, *JCVI issues new advice on COVID-19 vaccination for pregnant women - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/jcvi-issues-new-advice-on-covid-19-vaccination-for-pregnant-women [Accessed; National Advisory Committee on Immunization, *Archived 11: Summary of National Advisory Committee on Immunization statement of May 28, 2021.*

[72] NACI, *Archived 13: Recommendation on the use of the Pfizer-BioNTech COVID-19 vaccine in adolescents 12 to 18 years of age [2021-05-18]*, 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendation-use-pfizer-biontech-covid-19-vaccine-adolescents.html [Accessed.

Box 3: Prioritisation of children and young people in the UK

The UK's policy decision to vaccinate children and young people was characterised by a lengthy process involving deliberations between the Department of Health and Social Care (DHSC), UK Chief Medical Officers (CMO), JCVI and the MHRA, among other actors. While the Pfizer vaccine was already being used for the universal vaccination of teens in other countries, its use in the UK was limited. During the second phase of vaccine rollout the government considered the possibility of vaccinating young people below the age of 18 years. The DHSC asked the JVCI for advice on the possibility of this extension.

June 2021: Following an extensive review of the available evidence, the JCVI recommended vaccination in three groups of young people but cautioned against their universal vaccination:

- Children aged 12-15 years and over with specific underlying health conditions
- Vaccination of young people aged 16 to 17 years at higher risk of serious COVID-19 outcomes
- Children and young people aged 12 years and over to protect their immunosuppressed household contacts

August 2021: With time, the JVCI updated its advice to allow the vaccination of 16–17-year-olds to receive the first dose of their primary course of vaccination but withheld recommendations on the second dose until further evidence was available. The underlying assumption was that in a setting such as the UK, where the uptake of vaccines in the adult population is good, a precautionary approach to vaccine rollout among young people at a lower risk of serious harm from COVID-19 should be taken. Younger people were also expected to generate greater immune protection from the first dose of a COVID-19 vaccine, which offered 80% protection.

Early September 2021: According to the JCVI, the available data pointed to mild infections in 12–15-year-olds and infections tended to resolve on their own without treatment in most teens. The very few teens who required hospitalisations were mostly those with underlying conditions. Thus, the health benefits of vaccination were only marginally greater than potential known harms for healthy teens. These marginal benefits were too small to support universal vaccination unless there were other societal benefits for vaccination in the age group. However, the list of teens who were defined as having an underlying condition was expanded to include a broad list of conditions that were previously excluded.

Role of the CMOs: The judgement as to whether there were societal impacts for universal vaccination of 12–15-year-olds was left with the CMOs, who subsequently undertook a consultative process with experts from various Royal Colleges, Associations of Directors of Public Health, regional public health specialist and experts in data modelling. The CMOs recommended that universal vaccination should be considered in this age group on the premise that it was likely to help curb transmission of the virus in schools, which had the potential to house super-spreader events. Infections from schools were likely to cause local outbreaks. Vaccination was also expected to reduce the chances of individual children getting sick, thus preventing further school disruptions. The CMOs argued that should their universal vaccination recommendation stand, the JCVI should advise on the recommended dose and vaccination schedule. They cautioned that consent issues should be considered in an accessible, balanced risk/benefit communication to parents and teens and that no parent or teen should be shamed for either taking or refusing the vaccine.

The case study highlights how the UK,[73] with a similar approach to vaccine approval and vaccination to Canada, reached different conclusions in the context of uncertainty. The vaccination of teens for COVID-19, a condition where risk is closely tied to age, requires a careful consideration of the immediate risk of illness and the potential for long-term complications from infection compared to long-term immunity from a virus or vaccine. The complexity of the issues that need to be considered and the diversity of stakeholder opinions can make it difficult to come to a global unified policy, especially in a rapidly changing situation. The approval of vaccines for teens, made it clear that the UK policy makers favoured a wait-and-see approach in terms of the short- and long-term effects of the virus, whereas Canada focused on the safety and efficacy of the vaccine. The decisions were not only influenced by real-world data but by risk/benefit analysis of wider societal impacts. By the end of our analysis period (December 2021), the UK had not yet authorised the universal vaccination of healthy children below the age of 12 years, whereas Canada approved the vaccine for all Canadians aged 5 and older and had begun offer booster doses to the highest risk teens.

2.2.2.1.4. Prioritisation for the booster doses

In this section we describe how both countries weighed the need for boosters differently. The UK had already anticipated the need for a booster programme while Canada was still struggling to reconcile whether booster programmes were indeed necessary in the context of a global vaccine shortage. This was despite both the UK and Canada being contributors to the COVAX programme of the WHO and regularly donating vaccine doses to poorer countries through bilateral relations.[74] We also describe how a sudden change in the context due to the evolution of the easily transmissible Omicron variant led to quick evolution in policies on boosters in both countries.

In the UK, the JCVI offered interim advice by June 2021 on a prospective booster programme that would be rolled out in two stages from September 2021. The

[7373] Department of Health & Social Care, *Chief medical officers to consider vaccinating people aged 12 to 15 following JCVI advice* .Available online: https://www.gov.uk/government/news/chief-medical-officers-to-consider-vaccinating-people-aged-12-to-15-following-jcvi-advice [Accessed; Department of Health & Social Care, *Letter from UK health ministers to UK CMOs on COVID-19 vaccination of 12 to 15 year olds - GOV.UK*; Department of Health & Social Care, *Universal vaccination of children and young people aged 12 to 15 years against COVID-19 - GOV.UK*, 2021. Available online: https://www.gov.uk/government/publications/universal-vaccination-of-children-and-young-people-aged-12-to-15-years-against-covid-19 [Accessed; Department of Health & Social Care, *Young people aged 12 to 15 to be offered a COVID-19 vaccine - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/young-people-aged-12-to-15-to-be-offered-a-covid-19-vaccine [Accessed; PHE, *JCVI issues advice on COVID-19 vaccination of children and young people - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/jcvi-issues-advice-on-covid-19-vaccination-of-children-and-young-people [Accessed; PHE, *JCVI issues updated advice on COVID-19 vaccination of young people aged 16 to 17 - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/jcvi-issues-updated-advice-on-covid-19-vaccination-of-young-people-aged-16-to-17 [Accessed; PHE, *JCVI issues updated advice on COVID-19 vaccination of children aged 12 to 15 - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/jcvi-issues-updated-advice-on-covid-19-vaccination-of-children-aged-12-to-15 [Accessed.

[74] COVAX **Reference type not supported**

programme aimed to start with those most at risk from serious disease, such as care home residents, people aged over 70 years, frontline health and social care workers, clinically vulnerable adults and those who were immunosuppressed (Table 3). Since most young adults would not have received their first dose by late summer, the benefits of the booster would be considered later as more information became available.[75] As the autumn drew near the MHRA announced regulatory changes that would provide options for deployment of the booster programme with Pfizer and AstraZeneca vaccines after data showed that a person's immunity may wane and yet both vaccines safely and effectively boosted immunity. The MHRA also recommended that the JCVI offer advice on whether a booster programme should be offered and with what vaccines.[76] With the aim of keeping high levels of protection against hospitalisation or dying from the virus through the winter, in September 2021 the JCVI recommended that booster vaccines should be offered no earlier than six months after completion of the primary vaccine course. This was the same priority as during Phase 1 of the primary vaccination to those more at risk from serious disease and who were vaccinated during Phase 1 of the primary vaccination programme (priority groups 1 to 9).[77] However, when the Omicron variant emerged, the JCVI updated guidelines and asked all adults in the UK to receive a booster as long as three months had elapsed after their primary course of vaccination.[78]

Canada issued interim advice on prioritisation for the booster programme in October 2021. However, NACI was cautious about the use of the term "booster" as it needed more data on whether COVID-19 boosters qualified as true boosters or were merely a part of the primary course of vaccination. The interim recommendations were based on available evidence on waning immunity, safety and effectiveness. The intent of the booster dose was to restore waning immunity to a level that was deemed sufficient in individuals who initially responded adequately to a complete primary vaccine series. This was to be differentiated from a third dose administered as part of the primary course of vaccination for immune-supressed individuals. NACI acknowledged the call by WHO for vaccine equity but still recommended that boosters should be given to Canadians who were in need.[79] By the time of the recommendation, NACI argued that there was no evidence of decreasing protection over time against severe disease in the general Canadian population that had been vaccinated. NACI recommended that a booster dose of an authorized mRNA vaccine should be offered to all long-term care residents and seniors living in other congregate settings who had received a primary

[75] PHE, *JCVI issues updated advice on COVID-19 booster vaccination - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/jcvi-issues-updated-advice-on-covid-19-booster-vaccination [Accessed.
[76] Medicines and Healthcare Products Regulatory Agency, *MHRA statement on booster doses of Pfizer and AstraZeneca COVID-19 vaccines.*, 2021. Available online: https://www.gov.uk/government/news/mhra-statement-on-booster-doses-of-pfizer-and-astrazeneca-covid-19-vaccines [Accessed.
[77] PHE, *JCVI issues updated advice on COVID-19 booster vaccination - GOV.UK.*
[78] Department of Health & Social Care et al., *All adults in England offered COVID-19 booster vaccine* 2021. Available online: https://www.gov.uk/government/news/all-adults-in-england-offered-covid-19-booster-vaccine [Accessed.
[79] NACI **Reference type not supported**

COVID-19 vaccine series (with the primary series being a homologous or heterologous schedule using mRNA and/or viral vector vaccines) at least six months after the primary series had been completed. Vaccination in the rest of the population was recommended on a case-by-case basis (Table 4). However, in December 2021, due to the Omicron threat, NACI acknowledge the low levels of vaccination elsewhere in developing countries while recognizing Canada's risk of breakthrough infections with Omicron. It strongly recommended administration of a booster dose of an authorized mRNA COVID-19 vaccine six months after a primary vaccine series for those at highest risk and provided a discretionary recommendation for all other adults.[80] Ontario followed the NACI recommendations, while implementing its booster programme, initially offering boosters to the highest risk adults, but quickly extended eligibility to all adults aged 18 and older. However, Ontario also reduced the recommended interval from six months to three months.[81]

[80] National Advisory Committee on Immunization, *Archived 26: NACI updated guidance on booster COVID-19 vaccine doses in Canada [2021-12-03] - Canada.ca*, 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/guidance-booster-covid-19-vaccine-doses.html [Accessed.

[81] Office of the Premier **Reference type not supported**; Chief Medical Officer of Health, *Ontario Accelerating Booster Eligibility to Adults Aged 50+* 2021. Available online: https://news.ontario.ca/en/release/1001269/ontario-accelerating-booster-eligibility-to-adults-aged-50 [Accessed December 2]; Chief Medical Officer of Health, *Ontario Expanding Booster Eligibility to More Ontarians* 2021. Available online: https://news.ontario.ca/en/release/1001100/ontario-expanding-booster-eligibility-to-more-ontarians [Accessed November 03].

Table 3: Interim and updated prioritisation for the booster programme in the UK and recommendations for the booster programme in Canada

Interim booster advice June 2021 UK	Updated advice September 2021 UK	Canada updated advice
Stage 1		Strong Recommendation
1. Adults aged 16 years and over who are immunosuppressed 2. Those living in residential care homes for older adults 3. All adults aged 70 years or over 4. Adults aged 16 years and over who are considered clinically extremely vulnerable 5. Frontline health and social care workers	1. Residents in a care home for older adults and their carers 2. All those 80 years of age and over and frontline health and social care workers 3. All those 75 years of age and over 4. All those 70 years of age and over and clinically extremely vulnerable individuals 5. All those 65 years of age and over 6. All individuals aged 16 years to 64 years with underlying health conditions that put them at higher risk of serious disease and mortality 7. All those 60 years of age and over 8. All those 55 years of age and over 9. All those 50 years of age and over	1. Adults ≥50 years of age 2. Adults living in long-term care homes for seniors or other congregate living settings that provide care for seniors 3. Recipients of a viral vector vaccine primary series that was completed with only viral vector vaccines (AstraZeneca/COVISHIELD or Janssen COVID-19 vaccine) 4. Adults in or from First Nations, Métis and Inuit communities 5. Adults who are frontline healthcare workers (having direct close physical contact with patients) regardless of the interval between doses in their primary series
Stage 2		Discretionary NACI Recommendation (Table 4)
1. All adults aged 50 years and over 2. All adults aged 16 to 49 years who are in an influenza or COVID-19 at-risk group 3. All adult household contacts of immune suppressed individuals.		1. 18-49 years of age with consideration of jurisdictional and individual risks.

Table 4: Factors considered in deciding whether to administer a COVID-19 vaccine booster in the general population in Canada

Underlying factors for consideration	Evidence to be reviewed to determine the need for and benefit of a booster dose of COVID-19 vaccine
Risk/benefit analysis	• Risk of severe illness and death • Risk of exposure (including ability to physically distance and access to infection prevention and control • measures and health care) • Risk of transmission to vulnerable populations • Risk of societal disruption
Vaccine characteristics in different groups against wild-type and variants of concern	• Duration of protection • Immunogenicity • Efficacy/effectiveness • Safety and reactogenicity of boosters • Effect of vaccine in preventing transmission
Vaccine supply/types/intervals	• Number and type of available vaccines • Initial vaccination series (type, interval between doses, time since initial series)
COVID-19 epidemic conditions	• Circulation of SARS-CoV-2 wild-type and variants of concern. • Breakthrough cases, outbreaks • Case rates and implications for health system capacity

2.2.2.2. Vaccine schedule

In this section we describe the vaccination schedules for adults in the UK and Canada. Using two case studies, we show how by reviewing real world data, Canada and the UK made different policies on vaccination schedules. The first case study highlights constantly emerging evidence on viral variants led to complex vaccination policy processes.

In the UK (Box 4), the primary vaccination schedule was initially influenced by scarcity and efficacy data, but later updated to reflect the emergence of more aggressive COVID-19 variants,[82] While there were some shifts in the intervals between dose 1

[82] Medicines and Healthcare Products Regulatory Agency, *One-dose Janssen COVID-19 vaccine approved by the MHRA.*, 2021. Available online: https://www.gov.uk/government/news/one-dose-janssen-covid-19-vaccine-approved-by-the-mhra [Accessed; Medicines and Healthcare Products Regulatory Agency, *Moderna vaccine becomes third COVID-19 vaccine approved by UK regulator.*, 2021. Available online: https://www.gov.uk/government/news/moderna-vaccine-becomes-third-covid-19-vaccine-approved-by-uk-regulator [Accessed; Medicines and Healthcare Products Regulatory Agency, *Regulatory approval of Pfizer/BioNTech vaccine for COVID-19.*, 2020. Available online: https://www.gov.uk/government/publications/regulatory-approval-of-pfizer-biontech-vaccine-for-covid-19 [Accessed; Department of Health & Social Care, *Statement from the UK Chief Medical Officers on the prioritisation of first doses of COVID-19 vaccines - GOV.UK*, 2020. Available online:

and 2 and differed by vaccine, the policy was relatively stable. In contrast, Canada had a much more complex policy process.

2.2.2.2.1. Case study: effect of emergent aggressive COVID-19 variants on UK's primary vaccination schedule policy for adults above 18 years

Box 4: Vaccination Schedule for adults in the UK

By December 2021, in the UK, four vaccines had received approval for use in healthy adults aged 18 years and above with no contraindications. Pfizer/BioNTech, was the first to be approved, had a recommended vaccination schedule of two doses given 21 days apart. The second vaccine to receive approval was the Oxford/AstraZeneca vaccine with a vaccination schedule of two doses spread four-12 weeks apart. This was followed by Moderna with a schedule of two doses to be given 28 days apart. Lastly, the Janssen's single-dose COVID-19 vaccine was approved. Despite the manufacturer's recommendations, the JCVI recommended that as many people on the priority list should receive their first dose of the primary series of vaccination over offering second doses. They also expanded the time span between the first and second dose of the Pfizer/BioNTech vaccine to between three to 12 weeks. The extension was based on the argument that for both vaccines, the second dose completes the course and is likely to be important for longer-term protection. A pending global vaccine shortage was expected to linger for several months through the winter, a critical pressure period for the NHS. UK medical officers agreed with the JCVI that prioritising the first dose for as many people as possible offered the greatest protection from COVID to the population, reducing incidences of mortality, severe disease and hospitalisations. This would protect NHS resources and whole population health in the shortest possible time compared with prioritising second doses in a small number of people. Due to the emergence of the B1.617.2 variant (Delta), the JCVI recommended accelerating vaccination for all persons in priority groups 1-9 with their second dose being moved from 12 weeks to eight weeks, where vaccine supply allowed. The JVCI argued that this was possible because everyone in the most vulnerable groups had already been given the opportunity to receive their first dose. This case highlights how initial evidence-informed policies needed to be updated as the nature of the vaccine-preventable illness evolved, including the changing effectiveness of the vaccines.

Case Study: How did Canada end up with a four-month dose interval?

Canada's NACI recommended vaccine regimen significantly differed from that of other countries. Canada opted early in their vaccine rollout to have a prolonged interval between dose 1 and 2. The policy was initially based on the scarcity of vaccine resources, but later shifted to a policy aimed to promote stronger, longer lasting immunity. Whilst the long vaccine interval initially cause concern among Canadian citizens who were required to wait longer as the decision to delay vaccine dose intervals for the primary course of action, Canada was able to navigate through this challenge and managed to implement a policy that was accepted by all its provinces

https://www.gov.uk/government/news/statement-from-the-uk-chief-medical-officers-on-the-prioritisation-of-first-doses-of-covid-19-vaccines [Accessed.

and territories. In this case study we describe why and how Canada was able to implement this rather controversial policy as well navigate through the challenges it posed.

Box 5: Canada's longer four-month vaccine interval

Canada, a country with low vaccine manufacturing capacity was completely dependent on vaccine imports, leading the government to aggressively negotiate contracts for promising COVID-19 vaccine candidates. While successful in signing contracts with several manufacturers, there was concern that the reliance on global partners would lead to a very slow vaccine rollout in Canada. In fact, the first five months of Canada roll-out of vaccines lasted five months and were framed consistently around the need for equity during vaccine scarcity.

Vaccine scarcity: In December 2020, Health Canada approved the Pfizer-BioNTech and Moderna mRNA vaccines, with 2-dose regimens spaced 21 days and 28 days apart, respectively. The initial vaccine supplies were prioritized for long-term care homes, healthcare staff working in higher risk settings, and remote Indigenous (First Nations, Métis, and Inuit) communities. In February 2021, Health Canada approved the Oxford/AstraZeneca vaccine with a 4-12 week interval. As the vaccination programme shifted to the general at-risk population, an age-based approach was used to prioritise individuals for vaccination, starting with individuals aged 90 and older. In March 2021, given the limited vaccine supplies, NACI made a controversial recommendation that Canada should focus on administering first doses only, delaying the second dose for up to four months

Equitable, ethical, and efficient allocation: At the time of the recommendation, NACI stated that their recommendation was informed by modelling from PHAC and other national-level stakeholders. Canada's Chief Public Health Officer supported the recommendation, calling for the "equitable, ethical, and efficient allocation of authorized COVID-19 vaccines in the context of staggered arrival of vaccine supply."

Controversy: One day after NACI's recommendation, Canada's Chief Scientific Officer publicly questioned the recommendation, calling it "population-level experiment" in a national news broadcast. However, in early April 2021, an updated statement showed that the models had estimated that a delayed second dose policy would result in 12.1-18.9% fewer symptomatic cases, 9.5-13.5% fewer hospitalizations, and 7.5-9.7% fewer deaths in Canada over one year.

Implementation in Ontario: Prior to the recommendation, Ontario had already been gradually extending the dose two interval from 3-4 weeks to 5-6 weeks, partly due to concerns that reductions in allocation of Pfizer-BioNTech doses would have a substantial impact on vaccination distribution and create difficulties for organisations and communities. With NACI's recommendation, Ontario adopted the four-month dosing interval, highlighting that the "one dose provides good protection" and that the approach "maximizes the number of people protected in the shortest period of time." At this point, the roll-out was focused on older age groups and was not applied to long-term care or remote Indigenous (First Nations, Métis, and Inuit) communities. Other Canadian provinces followed similar processes.

Equity for whom? At the time of the NACI recommendation, the Ontario Science table also release a report highlighting the disproportionate impact of the pandemic on older adults living in racialised urban neighbourhoods. Two months later, Ontario finally prioritized vaccine access in high-risk postal codes, though it continued to use the delayed second dose approach.

Impact of the Policy: The extended interval policies rapidly accelerated Canada's first dose vaccine rates ahead of most other developed countries. Once vaccine supply increased, questions arose about when to give the second dose, particularly for those vaccinated early on. Factors considered included the ongoing variable vaccine supply, effectiveness of the first dose, duration of first dose protection, and balancing individual protection with population coverage (and the protection this provides for everyone). In addition, real world data from Israel, the UK, the US and the provinces of Quebec and British Columbia indicated a dose one offered 70-80% protection for up to two months. Once Canada had sufficient vaccine supply, NACI recommended an eight-week interval

This case study illustrates how vaccine scarcity must be balanced with population and individual risk.[83] However, the initial policy decisions to delay the second dose of the primary course of vaccination in both countries were prone to fluctuation as new variants emerged and as vaccine supplies became more widely available. In Canada, several changes were made over time that created confusion and potentially impacted vaccine confidence.[84] While it appeared relatively simple to adapt an interval based on supply, it was far more complex to implement an evolving policy at a population level. This highlights how when a policy is modified to optimize a response to a short-term problem, it can have lasting effects even as it is adapted to reflect changing supply or emerging evidence or risk or benefit.

2.2.2.3. Vaccine mandates

Although both the UK and Canada had COVID-19 vaccination mandate policies in the care sector and for international travel, and also had passport programmes for non-essential services, the documents reviewed only identified a consultation policy for the UK mandates and not for Canada. The mandates related to employment in Canada also spanned vast employment sectors and were more stringent.

2.2.2.3.1. Vaccine and employment in the care sector in the UK

In April 2021, the UK government started a five-week consultative process looking into a requirement for care home providers and those tasked with caring for older adults, to deploy only those workers who have received their full COVID-19 vaccination.[85] The extensive public consultation included thousands of staff, care providers, residents of care homes and their families. The proposed mandate was meant to further protect residents who were noted to be amongst the most at vulnerable to COVID-19 infections, and staff. The government observed some care homes were already implementing similar policies.[86] This consultation was undertaken in the context of only 65% of older care homes in England meeting the current recommendations for a

[83] V. K. Peter Zimonjic, *Canada's chief science adviser issues warning about B.C.'s 'experiment' with vaccine timing | CBC News*Available online: https://www.cbc.ca/news/politics/nemer-henry-vaccine-interval-experiment-1.5932714 [Accessed; Ministry of Health, *Extension of the Second Dose Interval*, 2021. Available online: https://mcusercontent.com/52d9e9dfa66c8bca909aa4569/files/5bf00393-47ba-465c-9bdd-28a0bd32eccc/2021_03_24_Extended_Dose_Key_Messages_2021_03_19_FINAL_EN_AODA.01.pdf [Accessed March 19]; K. A. Brown et al., 'COVID-19 Vaccination Strategy for Ontario Using Age and Neighbourhood-Based Prioritization' (2021).

[84] National Advisory Committee on Immunization, *NACI rapid response : Extended dose intervals for COVID-19 vaccines to optimize early vaccine rollout and population protection in Canada* 2021. Available online: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/rapid-response-extended-dose-intervals-covid-19-vaccines-early-rollout-population-protection.html [Accessed March 3]; Ministry of Health, *Extension of the Second Dose Interval.*

[85] Department of Health & Social Care, *Making vaccination a condition of deployment in older adult care homes - GOV.UK*, 2021. Available online: https://www.gov.uk/government/consultations/making-vaccination-a-condition-of-deployment-in-older-adult-care-homes [Accessed.

[86] Department of Health & Social Care et al., *Government to introduce COVID-19 vaccination as a condition of deployment for all frontline health and social care workers - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/government-to-introduce-covid-19-vaccination-as-a-condition-of-deployment-for-all-frontline-health-and-social-care-workers [Accessed.

minimum staff uptake level of one dose. This minimum was judged necessary to reduce the risk of outbreaks in these high-risk care settings.

In June, the DHSC announced that following the consultation, everyone working in care homes licensed by the Care Quality Commission (CQC-registered care homes) would need to be fully vaccinated against COVID-19 with two doses. Another consultation was planned to assess whether the law should be extended to other health and social care settings. Subject to parliamentary approval, care workers would have a 16-week grace period to get vaccinated unless they were exempt. The mandate was passed into a law in England on November 9, 2021. Subsequently, the Director of Adult Social Care and Delivery informed local authorities, directors of adult social services, care home providers, care home managers and agencies about criteria for self-certification on a temporary basis for people working or volunteering in care homes with a medical reason for being unable to take COVID-19 vaccination. Care home workers who considered themselves exempt would need to sign the self-certification form for people with medical exemptions or the self-certification form for people vaccinated abroad and show it to their employer as proof of their temporary exemption status.

2.2.2.3.2. Mandatory vaccine only certification in businesses and the hospitality sector in the UK

Following another consultative review over the summer and using feedback from businesses, event organisers and venue operators, including those with experience of voluntary certification requirements, the government proposed a mandatory 'vaccine only' certification for those aged 18 and above.[87] The mandate was proposed as part of a Plan B COVID-19 restrictions scenario.

In July, a successful trial of an NHS COVID pass was announced. The pass would allow people to access leisure activities safely and securely by demonstrating their COVID-19 status whether as proof of vaccination, following COVID-19 test results, or derived from natural immunity.[88] The use of COVID passes in settings considered to be essential, like supermarkets, was not encouraged. Other businesses and organisations in England could adopt the pass as a means of entry where it was deemed suitable for their venue or premises and when they can see its potential to keep their clients or customers safe.

During the Omicron wave in December 2021, the Health and Social Care Secretary announced that the government planned to introduce mandatory certification, based

[87] Department of Health & Social Care, *Proposal for mandatory COVID certification in a Plan B scenario - GOV.UK*, 2021. Available online: https://www.gov.uk/government/publications/proposal-for-mandatory-covid-certification-in-a-plan-b-scenario [Accessed.

[88] Department of Health and Social Care & The Rt Hon Sajid Javid MP, *Health Secretary's oral statement to Parliament on COVID-19 and Plan B.*, 2021. Available online: https://www.gov.uk/government/speeches/health-secretarys-oral-statement-to-parliament-on-covid-19 [Accessed.

on vaccines or tests, in nightclubs and large events. The aim was to reduce the number of unvaccinated, infectious people in venues, thereby limiting transmission overall. A call for supporting evidence was put forward by the government on the proposal for mandatory COVID certification in a Plan B scenario. If the plan had been approved by Parliament, the coronavirus (COVID-19) rules on attending certain venues and events in England would have been expected to change on Wednesday December 15 to mandate people aged 18 or above employed in the relevant sectors or those attending large social events must either:

- be fully vaccinated
- have completed a negative -PCR test or negative lateral flow test within the past 48 hours, or
- be medically exempt

2.2.2.3.3. Mandatory COVID-19 vaccination and international travel for UK Citizens

By June 2021, fully vaccinated international travellers to England from other countries were required to pay for and take a day two post-arrival PCR test. They were required to isolate until they got a negative day two travel PCR test result, or for a complete 14 days if the test was positive. This contrasted with unvaccinated international travellers who were required to buy and take post-arrival day two and day eight PCR tests and remain in self-isolation until negative test results were confirmed, or the full 14 days.

To qualify under the fully vaccinated rules for travel to England, a traveller must have had proof of full vaccination with a full course of a UK-approved vaccine and must have had their final dose at least 14 days before arrival in England. Proof of vaccination must also have been issued by either:

- the UK vaccination programme
- the United Nations vaccine programme for staff and volunteers
- an overseas vaccination programme with an approved proof of vaccination for travel to the UK

An update from the previously more stringent summer policy did not acknowledge mixed vaccine schedules and some vaccination programmes from overseas.[89]

Although the specifics of what was required for a vaccinated international traveller differed from what was required of a non-vaccinated international traveller, the proof of vaccination remained the only acceptable form of immunisation in the UK. Proof of natural immunity was never accepted as an alternative to proof of vaccination; neither was a negative COVID test. A COVID-19 pass for international travel was issued to

[89] Department for Transport & Department of Health and Social Care, *Approved COVID-19 vaccines and countries and territories with approved proof of vaccination - GOV.UK*, 2021. Available online: https://www.gov.uk/guidance/countries-with-approved-covid-19-vaccination-programmes-and-proof-of-vaccination#approved-vaccines [Accessed.

travellers from England who were fully vaccinated under the NHS programme and sought to travel overseas.

2.2.2.3.4. Vaccine Mandates for care work and other sectors in Canada

On October 6, 2021, the government of Canada announced that all employees of the Core Public Administration, including the Royal Canadian Mounted Police (RCMP), must be vaccinated. The mandate applied to all relevant workers, including those who were working remotely. Mandates were also implemented in other sectors. Failure to abide by the mandate would lead to administrative leave with no pay as early as November, 2021.[90] These mandates meant that all public servants employed by the federal government had to be either fully vaccinated or undergo regular testing. However, compared to the UK, no evidence in the documents reviewed for this report shows that a public consultation process was done before the mandate was implemented.

2.2.2.3.5. Vaccine mandates for international travel and government owned transport systems

In August the Minister for Transport announced the federal government's intention to make vaccination against COVID-19 mandatory for government-owned transport systems.[91] Vaccination was used as a criterion for travel to Canada by air or land. Members of the federally regulated air, rail, and marine transportation sectors had until October 30, 2021, to establish vaccination policies to ensure their employees were vaccinated. By July 2021, only fully vaccinated travellers were allowed to travel to Canada by air or land without restrictions. Additionally, travellers were required to have plans in place for quarantine as judgement of the acceptability of the fully vaccinated status was left to the discretion of boarder control agents.[92]

2.2.2.3.6. Vaccine mandates in the hospitality sector in Canada

During the summer of 2021, provincial governments in Canada started planning a return to summer gatherings and other activities with the intention of minimising disruption to businesses. In September 2021 the government of Ontario issued a vaccine passport system effective from September 22, 2021. The system mandated that individuals must be fully vaccinated (have received two doses for at least 14 days along with a photo ID) to enter public settings and facilities, including restaurants, bars, nightclubs, meeting and event spaces, conferences, sports and fitness facilities, gaming establishments, theatres, concerts, strip clubs and racing venues, among

[90] Government of Canada, *COVID-19 vaccination requirement for federal public servants - Canada.ca*.
[91] Transport Canada, *Mandatory COVID-19 vaccination requirements for federally regulated transportation employees and travellers*, 2021. Available online: https://www.canada.ca/en/transport-canada/news/2021/10/mandatory-covid-19-vaccination-requirements-for-federally-regulated-transportation-employees-and-travellers.html [Accessed October 6].
[92] Government of Canada, *Government of Canada's first phase to easing border measures for travellers entering Canada - Canada.ca*, 2021. Available online: https://www.canada.ca/en/public-health/news/2021/06/government-of-canadas-first-phase-to-easing-border-measures-for-travellers-entering-canada3.html [Accessed.

other facilities. However, the mandatory requirements were not applicable to outdoor settings or essential services such as medical, pharmacy or grocery services. The government also released regulations and guidelines for businesses and organizations to support the implementation of the vaccine certification in preparation for September 22, 2021.[93]

2.2.3. From research to policy and back to research

Although vaccine manufacturers regularly provided rolling safety and effectiveness data on a range of issues used to make policies, key questions remained unanswered. Is it safe to vaccinate pregnant women? How frequently should boosters be given? What should the vaccination schedule for immune-suppressed people look like? The UK in alignment with the mandate of the COVID-19 Vaccine Task Force launched leading studies on each of the issues that were under contestation. Some of these include the Cov-Boost study (world's first booster study), Preg-CoV and the OCTAVE DUO trial.[94] In addition to regular monitoring and surveillance, the UKHSA offered real world data that was used to inform policy in the UK and beyond.

Similarly, in Canada, the government commissioned several COVID-19 vaccine and treatment related trials starting in May 2020 and March 2020 respectively. Some of the areas that were investigated to inform policy included: COVID-19 vaccines among immunosuppressed adults; adverse events following the mix and match of vaccines; prevention of severe respiratory diseases among cancer patients; and safety of vaccine boosters among pregnant women, the general adult population and those living with chronic conditions such as cancer and kidney disease.[95] In addition, the government of Canada commissioned studies to build confidence in COVID-19 vaccines and address misinformation and disinformation in a bid to increase uptake. This was funded through the Immunisation Partnership Fund (IPF). The funded projects targeted not only a variety of vaccine-hesitant groups but also the general population, given the emergent nature of evidence around vaccines, which required continuous reinforcement of messages. For example, specific studies were funded to improve confidence in children's vaccines, among newcomers to Canada and within racialised communities and neighbourhoods.[96]

2.2.4. Actors (COVID-19 vaccination information purveyors) and communication channels

[93] Office of the Premier, *Ontario to Require Proof of Vaccination in Select Settings* 2021. Available online: https://news.ontario.ca/en/release/1000779/ontario-to-require-proof-of-vaccination-in-select-settings [Accessed September 01].
[94] UKRI, *Five new COVID-19 vaccine research projects announced – UKRI*, 2021. Available online: https://www.ukri.org/news/five-new-covid-19-vaccine-research-projects-announced/ [Accessed.
[95] Government of Canada, *Drugs and vaccines for COVID-19: Authorized clinical trials - Canada.ca*, 2021. Available online: https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/drugs-vaccines-treatments/list-authorized-trials.html [Accessed.
[96] *Ibid*

In this section we describe the key actors in communicating COVID-19 messages and the channels that were used.

2.2.4.1. COVID-19 vaccination actors in the UK

The deployment of the COVID-19 programme consisted of a complex set of government and private actors acting at the national, subnational and local levels that played roles in communicating vaccination policies. Actors spanned government agencies, NHS, private organisations, charities, businesses, influential persons, community members and COVID-19 survivors among others, partnering with the government to ensure good uptake of vaccines. The roles played by the actors ranged from approval of vaccines for safety and effectiveness to offering recommendations for how vaccines should be used in the population; and from ensuring the timely deployment of vaccines to building vaccine confidence at the grassroots level. Individual government-based actors included the Prime Minister, who issued calls for people to get vaccinated; the Secretary of State for Health and Social Sciences, who announced official policy decisions that the government had undertaken; the Parliamentary Under Secretary of State (Minister for Business and Industry), who communicated government policies related to securing of vaccines and other funding priorities; the Chief and Deputy Chief Medical Officers, who communicated the scientific aspects of the vaccine response; the Minister for Vaccine Deployment and the Minister for Equalities, who, through press conferences and releases, encouraged at-risk populations to get vaccinated. Official vaccination related policies were always posted on the official government website (GOV.UK) and on official government social media pages (Facebook, Twitter, Instagram and Snapchat). They were also frequently posted on the social media pages of the NHS and communicated through private and public radio stations and local Clinical Commissioning Groups (CCGs). Table 5 provides a summary of governmental actors in policy formulation and communication.

Table 5: Key communicators of COVID-19 vaccination policies in the UK

Level	Actor	Role in communication of COVID-19 vaccination response (2020-2021)
National government actors	Department of Health and Social care	-Coordinated the communication of the COVID-19 response -Offered regular updates on government intended courses of action and their rationale
	Department for Business, Energy & Industrial Strategy	-Communicated progress made in securing vaccines to ensure that the UK is future-proofed from new variants
	Medicines and Healthcare products Regulatory Agency (MHRA)	-Responsible for regulating all medicines and medical devices in the UK and regularly released statements on approved vaccines
	Joint Committee on Vaccination and Immunisation (JCVI)	-Issued advice on immunisation and how vaccines should be used in the population. Often gave statements and press releases on decisions made
	UKHSA, formerly Public Health England	-Provided guidelines and information materials for health professionals and the public -Provided monitoring and surveillance data
	Government Office for Science	-Called for government to certify clinical trialists
	Department for Levelling Up, Housing and Communities	-Offered funding boosts to the community championship schemes and local councils to improve vaccination uptake among underserved communities
	Professional bodies (Associations and Royal Colleges)	-Offered advice on issues under consideration within their jurisdiction
Sub-national actors	Researchers based at universities	-Offered advice on issues under consideration within their expertise by reviewing best available evidence -Conducted studies to inform the vaccination response
Local	Local NHS	- Played a key role in the “Every jab gives us hope” campaign
	Local councils	-Worked with CCG to spearhead local vaccination campaigns
	Community champion schemes	-Implemented community specific vaccination campaigns, such as door-to-door calls, and distribution of leaflets in shopping malls.
	Clinical commissioning groups	-Addressed critical concerns about COVID-19 vaccines in the community

We also identified examples of organisations in the private and charity sectors supporting vaccination policy implementation. Private sector organisations supplemented vaccine policy infrastructure by giving staff time off to get vaccinated, offering discounts to clients, offering paid leave in case of side effects or advertising COVID-19 vaccination. Marks & Spencer, a major retailer, offered space in its

shopping hubs to serve as vaccination centres and released some of its staff to work as ushers.[97]

Additionally, private sector organisations joined efforts to incentivise vaccination through offering discounts to clients to get vaccinated[98] and partnering on advertising campaigns. Businesses that partnered with government to support the advertising blitz of the “every jab gives hope” campaign included companies such as Amazon, Sky, Uber, Boots, Deliveroo, IKEA and Santander, Heineken, and many nightclubs. Dating APPs stepped up, including Tinder, Match, Hinge, Bumble, Badoo, Plenty of Fish, OurTime and Muzmatch. Telephone networks partnered with the government in the “get boosted now campaign” by sending out messages on individual mobile numbers. Campaigns that were targeted at young people were often framed around “don’t miss out on half term’s plans, good times, and the COVID jab” and were supported by TikTok and MTV.[99]

Meanwhile, organisations in the charity and governmental sector launched a campaign encouraging those eligible to get vital protection with a free flu vaccine and COVID-19 booster vaccine ahead of winter.[100] The campaign included a film that featured media medics (health professionals who believe in the use of modern media as a source of information) explaining it was more important than ever for people to get their winter vaccines as soon as possible. These messages were supplemented by advertising campaigns fronted by celebrities, such as renowned actors and sports celebrities (rugby, football, boxing, car racing), who encouraged viewers of short, scripted films and videos to be vaccinated .[101] On the ground level, faith leaders worked with the

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[97] G. Fagherazzi et al., 'Digital Health Strategies to Fight COVID-19 Worldwide: Challenges, Recommendations, and a Call for Papers', *Journal of medical Internet research*, 22, 6 (2020), e19284.

[98] Department of Health & Social Care & T. R. H. M. H. MP, *Leading dating apps partner with government to boost vaccine uptake - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/leading-dating-apps-partner-with-government-to-boost-vaccine-uptake [Accessed; Department of Health & Social Care et al., *Advertising blitz to urge public to get flu and COVID-19 vaccines - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/advertising-blitz-to-urge-public-to-get-flu-and-covid-19-vaccines [Accessed; Department of Health & Social Care, *Employers unite to encourage over a million staff to get the COVID-19 vaccine.*, 2021. Available online: https://www.gov.uk/government/news/employers-unite-to-encourage-over-a-million-staff-to-get-the-covid-19-vaccine [Accessed.

[99] Department of Health & Social Care, *New campaign launches targeting under-18s and their parents to encourage vaccine uptake, with ongoing support from TikTok and MTV.* , 2021. Available online: https://www.ecosia.org/search?q=New%20campaign%20launches%20targeting%20under-18s%20and%20their%20parents%20to%20encourage%20vaccine%20uptake,%20with%20ongoing%20support%20from%20TikTok%20and%20MTV.&addon=edgegpo [Accessed.

[100] M. T. M. Department of Health and Social Care, and The Rt Hon Sajid Javid MP,, *New film launched urging public to get flu and COVID-19 vaccines - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/new-film-launched-urging-public-to-get-flu-and-covid-19-vaccines [Accessed.

[101] Department of Health and Social Care and Maggie Throup MP, *F1 stars including Lewis Hamilton back COVID-19 vaccine drive* 2021. Available online: https://www.gov.uk/government/news/f1-stars-including-lewis-hamilton-back-covid-19-vaccine-drive [Accessed; Department of Health & Social Care et al., *Kicking COVID into touch: rugby stars support vaccine roll-out - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/kicking-covid-into-touch-rugby-stars-support-vaccine-roll-out [Accessed; Department of Health & Social Care, *Boxing stars champion COVID-19 vaccine as the 'best jab' of 2021 - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/boxing-stars-champion-covid-19-

Faith Minister and the Prime Minister's Places of Worship Taskforce in a drive to encourage the masses to get vaccinated.[102] Finally, a number of campaigns were fronted by a member of the general public who had experienced severe outcomes of COVID-19, such as hospitalisation or loss of pregnancy. These experiences were communicated through short films.[103]

2.2.4.2. COVID-19 Vaccination actors in Canada

Canada had an equally complex set of actors involved in communicating policy decisions at the federal and provincial level, such the COVID-19 Vaccine Task Force, NACI, Health Agency of Canada (PHAC), Health Canada, and Public Services and Procurement Canada (PSPC). Based on Canada's devolved government system, the federal government provides funding for health care but each of the country's 10 provinces and three territories are responsible for creating and delivering health care and public health services to their own citizens. Therefore, Canada's vaccine policies and communications are often layered, where they follow a broad national aim but each jurisdiction adds its own localized nuance to policy and implementation. The roles of the actors are summarised in Table 6 below.

Table 6: Key communicators of COVID-19 vaccination policies in the UK

Level	Actor	Role in communication of the COVID-19 Vaccination response
Federal	NACI	- Communicated recommendations for the use of COVID-19 vaccines
	Health Canada	- Communicated information on regulated health products
	Public Health Agency of Canada (PHAC)	-Promoted vaccination through offering updated guidelines to healthcare professionals and the public on vaccination
	Minister of Health	-Provided leadership and support to provinces on enacting health policy
	Canada Border Services Agency	- Communicated regulations related to vaccination and travel
Provincial	Ontario COVID-19 Science Advisory Table	-Provided weekly statistical summaries for COVID-19 health coordination -Integrated information from existing scientific tables, Ontario's universities and agencies, and the best global evidence
	Ontario Ministry of Health	- Developed policies on prioritisation and eligibility for vaccines
	Public Health Ontario	-Arms-length government agency providing guidance and monitoring of vaccination
	Ministry of Seniors and Accessibility	-Focused on helping people who do not have access to accessible transportation through family, neighbours or community organizations

vaccine-as-the-best-jab-of-2021 [Accessed; Department of Health & Social Care, *Football stars hail COVID-19 vaccine as the 'best defence' of 2021.*, 2021. Available online: https://www.gov.uk/government/news/football-stars-hail-covid-19-vaccine-as-the-best-defence-of-2021 [Accessed.

[102] H. a. C. Department for Levelling Up, Department of Health and Social Care, Kemi Badenoch MP, and The Rt Hon Sajid Javid MP,, *Government and faith leaders join forces to support booster drive - GOV.UK*, 2021. Available online: https://www.gov.uk/government/news/government-and-faith-leaders-join-forces-to-support-booster-drive [Accessed.

[103] Department of Health & Social Care, *Unvaccinated mothers urge pregnant women to get jabbed* 2021. Available online: https://www.gov.uk/government/news/unvaccinated-mothers-urge-pregnant-women-to-get-jabbed [Accessed.

Local	Regional Health Sciences Centre	-Supported vaccination programmes for Indigenous and remote communities
	Public Health Units	-Responsible for managing and overseeing the distribution and administration of vaccines for their entire region.

The Canadian government heavily promoted the uptake of the first, second and booster doses, arranging many partnerships with private individuals, agencies and businesses to achieve this. It produced a narrative that focused on scientific rationale using the available evidence-based research and outcomes. Health Canada published information about what underpinned its decisions in making vaccination policies, such as clinical trial data used for the vaccine authorisations or how primary and secondary outcomes were used to assess product safety and efficacy. This information was shared with the general public, referenced clearly in policy documents or readily accessible on government websites.[104]

Canada engaged in high-profile media campaigns to promote public health messaging. Press conferences and social media messages in both official languages of English and French were used to convey key messages, advice, new evidence and updates to policy as the pandemic and vaccination rollout progressed. The Prime Minister's press conferences were frequent at times, even daily during the first stages of the pandemic, providing leadership, direction and reassurance to citizens. The Prime Minister drew on experts to extend his authority by drawing in scientific evidence and the Chief Public Health Officer to speak publicly.[105] In Ontario, the provincial government also provided regular updates in English, with messages specific to the vaccine availability and eligibility in the province. The key provincial actors included government officials such as the Premier, the Chief Medical Officer of Health, and other ministers. This highlighted how Canadian policy was guided at a federal level,

[104] Government of canada, *COVID-19: How provinces and territories make decisions about how, who and when to vaccinate* 2021. Available online: https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19/vaccines/provinces-territories-decisions-how-who-when-vaccinate.html [Accessed August 11]; Government of canada, *Interim Order Respecting the Importation, Sale and Advertising of Drugs for Use in Relation to COVID-19*; Government of canada, *Ask the experts COVID-19 vaccines questions: Safety, ingredients and side effects*, 2021. Available online: https://www.canada.ca/en/health-canada/services/video/ask-experts-covid-19-vaccines.html [Accessed December 14]; Government of canada, *Social media and promotional resources for Health Canada and Public Health Agency of Canada*, 2021. Available online: https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/digital-resources.html [Accessed November 17]; *COVID-19 Vaccine Q&A*, 2021. Directed by Web Page (2021). Available online: https://www.youtube.com/watch?v=OkIqjRU6Fxc [Accessed July 05]; f. Premier doug **Reference type not supported**

[105] Government of canada, *COVID-19: How provinces and territories make decisions about how, who and when to vaccinate* ; Government of canada, *Interim Order Respecting the Importation, Sale and Advertising of Drugs for Use in Relation to COVID-19*; Government of canada, *Ask the experts COVID-19 vaccines questions: Safety, ingredients and side effects*; Government of canada, *Social media and promotional resources for Health Canada and Public Health Agency of Canada*; *COVID-19 Vaccine Q&A*; Premier doug **Reference type not supported**

but implemented at a provincial level, leading Canadians to rely on information from multiple sources of government to make decisions about vaccination.[106]

For public updates, the Health Canada regulatory agency and Public Health Agency of Canada (PHAC) used their Twitter page, Healthy Canadians Facebook page, TV channels and Government of Canada official websites. Updates were frequently posted and shared as new findings and guidance emerged. The large geographic size of Canada also meant that announcements were impacted by variables such as language (two official languages of English and French), time zones that ranged by 4.5 hours, provincial and territorial government policy and the vaccine brands prioritised, based on population density. As a result, Canada had additional layers of complexity to navigate when building and updating guidance. Similarly, the Ontario Ministry of Health also posted regular updates on its websites and social media sites specific to vaccination eligibility.[107]

Great value is often placed in self-determination and decision-making based on logical rationale. Consequently, discussion panels employing epidemiologists, physicians, public health professionals and policy makers were influential. For example, the Canadian initiative “Ask the Experts: Experts Answer Questions About Vaccines” provided guidance by making medical experts available to the general public in virtual question and answer sessions, using online platforms such as Zoom.[108] Commonly asked questions about vaccine safety, efficacy and side effects could be aired to support the public in making positive decisions regarding vaccination. Sessions were streamed live on TV and YouTube channels and recordings were made available by the non-profit host organisation Immunization Action Coalition (IAC), now rebranded as Immunize.org. The initiative has been regularly updated and includes further materials such as printable posters, infographics, links to other websites and content retelling people’s experiences and stories about COVID-19 vaccines. The validity and credibility of answers provided in these sessions and veracity that vaccination was safe and desirable was asserted by high-profile appearances and consistent support from government leaders. For example, the Prime Minister took part in a virtual question-and-answer session to answer questions from parents and children about the COVID-19 vaccine.

Methodological reflections

The project design for the policy analysis had a number of strengths and limitations. A key strength of this component of the project is that a wide-ranging search was conducted on policy documents and modes of communication related to COVID-19 vaccination over a long period of time. Thus, we were able to document the evolution

[106] *COVID-19 Vaccine Q&A.*
[107] Government of canada, *Social media and promotional resources for Health Canada and Public Health Agency of Canada.*
[108] Government of canada, *Ask the experts COVID-19 vaccines questions: Safety, ingredients and side effects.*

in COVID-19 policies and characterise their evolution. The analysis was also able to guide our subsequent qualitative enquiry into how policy responses might have unintendedly contributed to vaccine hesitancy. Key limitations included being unable to conduct a sensitive search using key words on social media sites owing to their limited search engine functions. Moreover, our data were limited to policies communicated formally on government portals. The implication of this is that we are unable to assess the effect of random statements made by, for example, government officials or scientific advisers in their capacity that are not acknowledged as but are often misunderstood by the public as government policy.

2.3. Conclusion

Our policy analysis indicates that the UK and Canada were able to withstand uncertainty and fluctuations created by the global COVID-19 pandemic through adopting a proactive stance. The policies in both countries were informed by scarcity, though Canada's greater vaccine scarcity led to more complex policies. Similarly, both countries considered ethical principles such as beneficence, non-maleficence and justice, but Canada had clearer policies aimed at addressing the impact of systemic racism on the pandemic. Yet, even with those differences, both countries ensured that their respective populations were able to access vaccines by creating actors dedicated to overseeing vaccine specific policy, such as establishing national vaccine task forces, and by adopting a multisectoral response and deploying targeted funding.

It was also clear that both countries had rapidly evolving policies, aiming at times to provide consistent messaging on risk vs benefit, but at other times rapidly shifting in the response to emerging evidence of safety or real-world effectiveness. Interestingly, looking at cases such as the approval and use of the AstraZeneca vaccine highlighted how both countries could view the same data and reach different decisions. In Canada, vaccine scarcity conflicted with concerns about the safety of the AstraZeneca vaccine. Canada responded by engaging more actors to weigh the risks and benefits and increasingly local levels. In the UK, a more stable policy approach was used that aimed to convey a consistent message of weighing risk and benefit.

Despite the international nature of the pandemic, there seemed to be a disconcerting lack of policy related to proliferation of misinformation/disinformation on vaccinations. As such, both countries adopted a reactive, rather than proactive stance to vaccine mis/disinformation. Both countries were enacting vaccine specific policy in an increasingly globalised setting. Their decisions were guided by international medical evidence that was widely shared online, including with the public. This also meant that as each country competed for procurement of vaccines with other developed countries, and developed policies accordingly, those policies were visible to international actors.

These findings point to the need to build the necessary policy architecture to navigate rapid change and uncertainty. Such policy should enable the creation of relevant actors, deployment of funds and the rapid adoption of a multisectoral response. However, such policy will be functional without an acknowledgement of our globalised world, highlighting the needs for consistent global policy where policy, and the development of policies specifically addressing misinformation through international networks on social media.

3. Qualitative research

3.1. Methods

The policy analysis began before qualitative data collection but there were periods when the policy analysis was conducted alongside the qualitative interviews. Initial findings from the policy analysis informed our qualitative inquiry and sampling strategy. Interviews were conducted in parallel by research teams in both the UK and Canada. The qualitative study sought to understand how COVID-19 vaccination-related policies were communicated (diffused) in the community, how societies responded to the policies and to identify community-level interventions that have been used to build vaccine confidence.

3.1.1. Ethics

The study received ethical approval from the ethical committee of the University of Lincoln (Ref: UoL2021_7356) for UK-based research and an ethical amendment from the ethics committee of the University of Waterloo (Ref: UW 43633).

3.1.2. Recruiting interviewees

In line with qualitative research methodology, we sampled our interviewees purposively. We selected people that we believed had rich information in relation to COVID-19 vaccine uptake and hesitancy. In addition, our existing networks and initial interviewees provided us with interviewee referrals (snowball sampling technique).

We sampled a broad range of people from areas with high and low vaccine uptake in urban and rural areas. We also sampled those who were involved in the COVID-19 vaccine response at different levels of governance. We recruited healthcare providers from different levels of the care system. In addition, people from different employment sectors such as home care, care homes, hospitality, aviation and religious backgrounds were targeted. We recruited a broad range of interviewees in senior roles, as well as those who were working directly with vaccine hesitant groups, some of them belonging to multiple categories. A summary of the interviewees recruited is provided below (Table 7). In total, our findings are based on 31 in-depth online interviews of participants from East Midlands (Derbyshire, Leicester City, Nottingham City, Lincolnshire and North Lincolnshire) and 29 in Ontario (Waterloo).

Table 7: Interview participant summary in Canada and UK

Type of participant	Canada	UK
Rural	✔	✔
Urban	✔	✔
High uptake	✔	✔
Low uptake	✔	✔
Ethnic minority	✔	✔
Community champion	✔	✔
Frontline vaccinators	✔	✔
Professional body leaders	✔	
Midwives	✔	✔
Doctors	✔	
Senior government official	✔	✔
Public health official	✔	✔
Faith figure	✔	✔
Community champion	✔	✔
Minority ethnic leader	✔	✔
Charity organisation	✔	✔
Aviation sector		✔
Hospitality sector		✔
Business sector	✔	✔
Education sector	✔	✔
Home care and care home sector	✔	✔
Student	✔	✔
Vaccine hesitant		✔

3.1.3. Data collection

We conducted in-depth interviews online through the Microsoft Teams application, following a predesigned interview guide. There was a separate tool for policy makers or communicators and for community members or people who receive the policies. The interview guides were pre-tested with community champions who worked closely with community members. This enabled us to adapt our interview guides to better capture the natural sequence of responses. We also analysed the data from the community champions. Four of our research team members experienced in qualitative interviewing conducted all the interviews in both countries (AN, DN, ES and LV). The interviews were audio recorded and automatically transcribed by a built-in transcription function within Microsoft teams. After every interview and prior to analysis, our team of interviewers cleaned the transcripts by listening to the audio recordings while reading through the transcripts, correcting any errors. Finally, we imported the cleaned interviews into a qualitative analysis software-NVivo, ready for initial coding.

3.1.4. Data analysis

We undertook thematic analysis guided by its six phases (data familiarisation, initial coding generation, search for themes based on initial coding, review of themes, theme definition and labelling, report writing) to make sense of our data.[109] Before the first step (during data collection), the four interviewers and other research team members met weekly to reflect on emerging themes and to identify areas for deeper inquiry and points of data saturation. Three of the interviewers also led the data analysis process. They read and re-read the transcripts to gain familiarity with the content. They then undertook an initial coding process guided by themes within the interview guide and emerging codes captured during the weekly data collection review meetings. Our search for themes happened concurrently with the initial coding, which was a slight modification to the six phases of thematic analysis put forward by Braun and Clarke. Once the lead analysts completed the coding, they explored the linkages and relationships between the codes to create the initial themes. They then shared the themes with the entire research team for review and discussion through virtual meetings. This allowed the international research team to have a collaborative approach to interpretation of the analysis process. We discussed interpretations of the themes, points of convergence and divergence between the countries and reached a consensus over three meetings. This iterative process enriched the interpretation and enabled the final definition and labelling of the themes.

3.2. Results

Thematic analysis revealed five themes: (1) Communication sources; (2) Means of communicating COVID-19 policy; (3) Understanding and interpretation of communication; (4) Societal responses to communication; (5) Community level Interventions to improve vaccine uptake.

3.2.1. Communication Sources

In the UK and Canada, perceptions varied about how COVID-19 vaccination policies were communicated. The degree to which any party had a role in creating policy was considered to influence perceptions about the quality and success of communication. Those with ability to create policy are referred to as primary sources. These parties broadcast polices that secondary sources contextualised and enriched, taking information from primary sources and further disseminating policy to the public. Tertiary sources had no role in policy decision making but none the less contributed to policy understanding. Tertiary sources add additional contextualisation, bringing information to the public through translations and through new formats, including discussion. Recipients of tertiary source information may not be able to fact check and

[109] V. Braun & V. Clarke, 'Using thematic analysis in psychology', *Qualitative research in psychology*, 3, 2 (2006), 77-101.

may pick up hearsay, assumptions and bias made in secondary and tertiary communication.

3.2.1.1. Primary Sources

The UK interviewees considered the primary sources of COVID-19 vaccine information to be Her Majesty's Government. The senior leaders in policy communication were perceived to be Prime Minister Boris Johnson and government senior scientific advisors Dr. Chris Whitty and Dr. Jonathan Van Tam. Government communicators used both traditional broadcasting methods, such as televised announcements and press releases, as well as website and social media publications via ministerial departments. Equivalent actors presented information for the devolved governments of Scotland, Northern Ireland and Wales.

To attend to geographic differences in infection rates across the UK, local government bodies worked closely with policy and guidance delivered by ministerial departments. This included new announcements by city mayors and county council leaders. Given their role in making decisions and creating new policy interpretations fit for local purpose, these actors can be considered as primary sources too. In the East Midlands, Lincolnshire County Council, Leicester City Council and Nottingham City Council communicated and disseminated national government policy to local health, education and business services, which, as secondary sources, communicated them in contextualised form to clients and workforces. As the pandemic progressed, the layers of information being received from primary and secondary information sources were sometimes seen as inconsistent with one another. This can be partly attributed to the required variation in local responses to deal adeptly with the public health challenges of the pandemic and the pace of change in national response. Scientists supporting the government were felt to provide more consistent messages. One operational staff member noted the following:

> *"The underlying message [about vaccines] didn't change from the scientists, but government was a bit flipped around a little bit with some of it"*
>
> **Senior Operational Staff, Lincolnshire, UK**

Similarly, in Canada, interviewees saw the primary source of information to be the Federal Government, with Prime Minister Justin Trudeau providing leadership and calling on experts in public health and the National Advisory Committee on Immunisation (NACI) to validate policy content. Federal government communicators also used traditional broadcast and publication methods, including public announcements and press releases supported by detailed website information (e.g., Health Canada’s recommendations on vaccination). More contemporary social media platforms were also deployed.

As the pandemic progressed, more interpretation was needed at provincial and local levels to match evolving geographic differences of infection rates and public health measure responses. The devolved nature of government in Canada led to provincial leaders, such as Ontario Premier Doug Ford, taking on primary roles in creating and communicating vaccination policy, recommendations, and guidance. Provincial governments were supported again by health experts and used similar broadcast methods. Operationally, this led to increased layers of information emerging with multiple supporting websites. One organisation's head of communication described the transition from federal to provincial communication as follows:

"It was more ad hoc initially at the federal level where we're just [saying] 'Let's listen to what the Prime Minister says and translate that', but as we matured into the pandemic, I suppose there was more of that messaging coming from provincial organizations and sources."

Vice President, Communications, Canada

3.2.1.2. Secondary Sources

From the beginning, secondary sources of policy communication emerged, taking up formal and informal roles in interpreting and relaying policy. Each source, being influenced by its own environment and objectives, added its interpretation of primary policy. Using established governance and communication methods, these organisations took primary source policy and added context-specific interpretation, making information appropriate to their audience and passing the communication along. In each country, formal secondary sources included those tasked with interpreting vaccination policy to support implementation measures, local vaccine task forces, healthcare providers, public health advisors, professional associations and pharmacies. This secondary layer could be broadened to include other community organisations and businesses with essential and non-essential workers, the defining feature being capacity to access primary information and build on it such that it was fit for purpose.

Informal secondary sources are defined as those who used less methodical approaches to sharing information from primary sources. Informal secondary sources included casual social groups with less formalised, unregulated reference to belonging or membership. They also included people with discussion groups and email lists. As secondary sources they endeavoured to share primary source information but had fewer resources available to do so in a systematic way.

In both countries, formal secondary sources were influenced by local context, service delivery objectives and resources available to interpret and implement primary source policy guidance. Many formal secondary sources drew on previously targeted audiences and established strategies in place to aid communication. The variety of workforces acting on vaccination policies and their diverse organisational values, cultures, communication preferences and goals understandably led to different elements of policy gaining emphasis.

In the UK, essential and non-essential workers had access to primary information via media outlets such as press releases and relied on secondary sources to share implementation of the guidance. Like the UK's primary sources, secondary sources had established formal strategies to target audiences who were perceived to be vaccine hesitant.

Secondary sources in both countries emphasised the need to ensure guidance was accessible in various languages to remove barriers to policy information and reduce the spread of misinformation intentionally or unintentionally by tertiary translating sources.

"I would say that working with the translator did really help…the flyers were in four languages, so it's trying to appeal to as many different language speakers as possible"

NHS Community Engagement Manager, Lincolnshire, UK

"At times policy around vaccination and COVID-19 has been defined by the communication"

Vice President, Communications, Canada.

Interview respondents from Lincolnshire in the UK noted a range of both direct and indirect publication methods used to communicate policies. Strategies included press releases, radio, posters and conversations with the public at health appointments.

"So what methods, did we use? So obviously, there's the mainstream media messages, so just you know, starting with kinds of wide communications, via press releases and you know, regular media appearances, so using our mainstream media and linking in with radio like BBC Radio Lincolnshire and Lincs FM"

Senior Nurse and Vaccine Co-Ordinator, Lincolnshire, UK

"We have posters in the clinics and infographics, so those are used as a visual aid in the clinic, but most of it is done through conversation as we have a couple of vaccines that we recommend during pregnancy, flu and whooping cough. So, we often have the conversation about all three vaccines at most appointments"

Midwife, Lincoln City, UK

However, some respondents that were considered secondary sources, such as general practitioners, were concerned about how accessible primary source policy was to be interpreted and implemented. COVID-19 vaccination policy was reported as lacking guidelines and failing to provide clear public health regulations as expressed by a GP (General Practitioner) in Nottinghamshire:

"Lots of clinicians had to work their way up to gather information…I think there wasn't any official communication around vaccination…There wasn't an official policy that was sent down to follow a guideline"
General Practitioner, Nottinghamshire, UK

In Canada, interview respondents indicated their organisations used tried-and-tested strategies to communicate vaccination policy, drawing on a mixture of in-person methods, albeit offered remotely at times, and more indirect methods such as email and newsletters.

"Our CEO introduced [Zoom calls] very early in the pandemic 'cause there was so much information to communicate to staff. He was like, 'Hey, we'll just do a zoom call every week that every single person who works in this hospital can attend'"
Physician, Rural Area, Canada

"My style of leadership is to be there … a lot of the communication does come directly from me, whether it's through written communication, whether it's through One-call. … I did lots of little videos along the way to share with staff"
Care Home Director, Canada

"Email has been incredibly effective at reaching people right where they are, and galvanizing them"
Vice President Communications, Canada

In interviews, leaders spoke with a high degree of confidence. They also assumed that their message was reaching their audience, which could have led to understanding and uptake of ideas.

"I am the bridge. I'm the means to pass things on to the University group by email, as well as two groups through our church, friends…literally around the world."
Church Group Leader, Canada

The informal secondary sources were many and varied. With no formal standards governing their communication, anyone with a group of listeners, mailing list, Twitter feed, Facebook page, WhatsApp group, etc, could become a communicator about vaccination guidance either briefly or long-term, with consistent messages or not. Informal communicators at this level had varying interest or willingness to reference primary sources. They were only moderated by peers and consumers. These conversations added to wider understanding of and dialogue about vaccination and further contributed to bringing primary source information to life, as this community group leader expressed.

Whether formal or informal sources of information, interviewees were often concerned about the complexity in navigating vaccination guidance. Official websites were

reported as appearing impenetrable in both language and layout as illustrated by this one person chairing a COVID-19 safety committee who commented;

> *"If it could be less dense, I think that would have been helpful. It was hard to find some of the stuff when we were wading through; what is the actual public health regulation here?"*
>
> **Community Group Leader, Canada**

The need to decipher guidance and supporting materials was a reoccurring theme in analysis. Comments appearing around the clarity, complexity, use of plain language and syntax permeated many interviews. This observation points to a key difference experienced in stratified layers of communication; organisations with more formalised communication strategies typically had greater resources available to decipher policy, construct a narrative around it and synthesize a message that they could adapt for and target to their audience.

3.2.1.3. Tertiary Sources

A third stratification level was revealed by interviewees' reflections on efforts to reach groups of people who were isolated by language, who belonged to religious communities with low vaccine confidence, or who had limited access to. People in these groups were viewed as highly influenced by the interpretation of policy by an antecedent or third party. Individually they had little or no means or interest to check facts, or test assumptions or translations made by this interceding actor. In both countries, people with language barriers not addressed by formal communicators received information from tertiary sources alone.

Frontline staff, community champions and operational staff were viewed as the key secondary sources in using direct strategies to communicate vaccination policies to the public. Tertiary sources were sometimes viewed as being more in touch with the public, as well as with isolated individuals. They helped share information and these conversations added to a broader understanding of and dialogue about vaccination. They contributed to bringing primary source information to life further, as one UK Public Health Professional expressed:

> *"It might be talking to community champions because we know they're in touch with communities and can get the message out, you know far better and more successfully than we could ourselves"*
>
> **Public Health Professional, Lincolnshire, UK**

In the East Midlands for example, community champions for individuals from Polish communities expressed how they used information on vaccination policies that combined UK and Polish guidelines. Interviews with community champions revealed cross-country information may be influential in the interpretation of policies.

"So, what we are finding, Polish people are more likely to use information outside of the UK. They will rely quite a lot on things, you know what Polish TV tells them or what their Polish friends or family tell them and that could sometimes be quite misleading because the guidelines might be different"

Representative Polish Community/Community Champion, Leicester City, UK

Similar sentiments were also expressed by African immigrants.

"*So those of us who came from Africa as an adult, you know, we already have our attachment back home. So, in a way we live in two cultures, so I can see if my sense of belonging is not stronger. I cannot really fault the government, the information is out there, all the African diasporas use the mainstream media uh is flagged as their first point of call, and then they use their own media"*

Minority ethnic lecturer in Journalism, Lincolnshire, UK

In Canada, people perceived as highly influenced by the interpretation of policy by a third party included those in communities isolated by language and cultural barriers. As expressed below, public health officials felt this intermediary step in the communication chain contributed to vaccine hesitancy in insular groups, for example some Mennonite communities in rural Ontario.

"I can't specifically say that the information I give to them is then being transferred to their congregations...The bishops are very influential. I think if they said to their congregations, you need to get the vaccine, then they would listen"

Vaccination Clinic Team Lead, Canada

Other individuals in this third level are less hidden away, but still highly influenced by limited intermediary communicators. Such individuals may be vulnerable people because of age, health or immigration status, as hinted at by this pharmacist.

"I think about the 85-year-old lady, grandma, who is in her home without a computer. Who is she getting her information from? Is that her only source of information, the television? Is it her neighbour, who heard it from so and so who heard it from so and so? Do we really think about how messages are received and by who? Is there a way for us to access the most vulnerable in our community so that when they make decisions about their health, they're getting information that's reliable?"

Pharmacist, Urban Area, Canada

3.2.2. Means of communicating COVID-19 polices

All formal COVID-19 policy communication from both countries came through both written and verbal communication often by press releases published on institutional websites and broadcast on both radios and television channels. The text was communicated in various languages and through institutional websites, press releases

and social media accounts. Similarly, verbal messages came in diverse languages, passed on through formal TV or radio media and press releases, social media and by word of mouth. Oral communications ranged across a spectrum of styles from formal to informal. The former included webinars arranged to inform diverse groups, through structured meetings to more *ad hoc* interpretations offered by members of the public for other community members. The content of presentations varied too, sometimes aimed as general information sessions, sometimes targeted at breaking down specific communication barriers. Below we give more details on both written and verbal means of communication.

3.2.2.1. Written text

Written text was widely used to communicate policy guidance in both countries. While a strength of written materials is that they can be reread many times, enabling readers to digest and comprehend meaning carefully, it can be difficult to keep guidance up to date. This is particularly true for printed material that goes into circulation and is widely dispersed. The problems associated with maintaining timely, accurate versions were also felt across internet sources of written policy, recommendations and guidance.

The length, tone, style, reading age and formatting of written documents were viewed as key factors in the reception of policy. In addition, written texts were translated into many languages in the UK and Canada, enabling literate people from diverse cultures to engage with information about vaccines. However, not all adults' native tongues were accommodated by official translations and translations were often delayed, causing inequalities in access to information.

In the UK, translated texts were observed at primary, secondary and tertiary levels, including National Institute for Healthcare Excellence (NICE) guidelines, as well as informal community level flyers. While it was generally perceived that written texts enabled outreach to many people, some were described as hindering engagement. Some interviewees did note a lack of resources for translation, reflecting the difference in prioritisation of multicultural needs. A religious leader and community champion in Leicester noted up to 10 translations included in guidelines.

"When we took the vaccine to the factory [there] was some discourse within the diverse groups that work within the factories…So, you think you are going to put an action 'let us take vaccines to a factory'. But we did not understand the cultures, values, and beliefs in that little micro group of individuals working at the factories."
Vaccine Programme Lead, Lincolnshire, UK.

"The communications we developed were just quite bland, just kind of, based on the NICE guidance or whoever was producing them the Medicines & Healthcare Regulatory Agency (MHRA), whatever they're called, so kind of the very standard stuff about therefore it's safe, it has been well tested, etc. And they were quite short and then translated into ten different languages."

Religious Leader and Community Champion, Leicester City, UK

Indeed, public health professionals acknowledged the importance of providing resources in various minority languages spoken in the region, including Polish. Polish vaccine champions worked closely with health care professionals in the dissemination of guidelines via social media outlets such as Facebook, Telegram, and instant messaging like WhatsApp. One community representative commented on this but expressed concerns about a lack of moderation:

"Our organisation's Facebook became one of the main mediums for promoting the information, but also sites like Telegram, it is remarkably like Facebook, and you will notice lots of Polish people using Telegram. WhatsApp groups are also quite popular but at the same time they can be quite dangerous because people can put anything there and there is no moderation."

Representative for Polish Community/Vaccine Champion, Leicester City, UK

Similarly, some frontline staff in both countries attributed lower engagement by individuals from low socio-economic groups as being due to a lack of credible information. Staff especially held this assumption for individuals whose first language was not English.

"Places with high deprivation index do not necessarily read all the communication and do not read the newspapers where the good articles are. They do not listen to informative things on the radio. A lot of them do not have the NHS app because they do not have the right phone."

Frontline Staff, Lincolnshire, UK

Many comparable observations were made in Canada by communicators and recipients of written COVID-19 policy and guidance. Canada is a bilingual country and like the UK, increasingly a multicultural society in which residents speak many languages. Linguistic translators acted at all layers of communication stratification, ranging from the primary, formal level of communication in government to informal discussions of guidance. Any and all of these levels could be subject to bias or prejudice through linguistic choices, text and tone. The qualitative research undertaken for this report revealed that the timing, quality and availability of translated written materials were perceived as important determinants of how public health guidance was received and acted upon. Those tasked with implementing vaccination policies noted the barrier created by inadequate translation resources when conveying information to their target populations, as noted here by a Public Health official in Waterloo region.

"That's a big barrier not having resources in multiple languages, we know that counts in such a multicultural country… not all areas, or public health units or municipalities have the capacity to translate information"

Public Health Officer, Canada

Canada has careful provision of public materials in French and English. In Ontario, where English predominates, French media become quickly available with plentiful resources assigned to support their use. This contrasts with the situation for other languages, with comparably large populations of speakers in Ontario. Without centralised resources or adequate planned provision, various Public Health Units had to act quickly to acquire translated materials where they could. Often these units shared resources but they were not always certain of the origin or quality of translation. The Waterloo region official continued,

"You end up with piecemeal information that's being translated and being shared without people knowing the source of the information or the accuracy of the information"

Public Health Officer, Canada

The impact language barriers had on vaccine confidence, particularly in communities with other reasons for hesitancy, is referenced here by a vaccination clinic manager and discussed in more detail below with reference to Community Level Interventions to Improve Vaccine Uptake.

"We really missed some of the priorities around who needed that extra help…. I wish that when we released information, we had it in our top 10 languages at the same time. It felt very difficult to say to people. 'Oh, the translations are coming'"

Vaccination Clinic Team Lead, Canada

Alongside resources required for translation, more vulnerable community members also needed resources to support navigation of complex written vaccine information. Several interviewees referred to primary source disseminators relying on their audiences reading and digesting written information. They expressed concern that reading age could be a barrier, particularly to those with English as their second language.

"It's not at a digestible level for a lot of our population, especially whose language first language isn't English"

Vaccination Clinic Team Lead, Canada

"Because of the computer age, we are now expected to read everything. People don't read, yet we have been having to rely on reading the directives from public health on websites. The newspaper, they will interpret it and the CBC will interpret it. I think that's where people are getting their information"

Community Group Leader, Canada

Adjusting content for audience need, cultural sensitivities and selecting an appropriate reading age were perceived as critical ways of facilitating comprehension. Complex

texts and those with too much information were sometimes believed to be unhelpful in getting the message across.

"Having things at different levels of technicality has been helpful. You have some patients where you want something that's in really simple non-scientific language Then you have other people where you want something that has not only more detail from a technical standpoint, more statistics...meaty...even just something that sounds more scientific"

Physician, Rural Area, Canada

As indicated by these voices, when primary sources relied on their audiences' ability and willingness to read and comprehend complex texts, they essentially ceded control of their messages to those willing to interpret and contextualise information. Diffusion could be viewed as a highly appropriate description for how innovation ideas are wafted and batted about under these circumstances, rather than driven in a known direction. It is worth noting, interviewees offered many examples of websites and communicators doing a good job of translation at this level, as demonstrated by an outreach worker below and doctor below. However, it is nonetheless important for policy makers to appreciate message distortion can occur if they don't continually provide direction, monitor outcomes and rebalance policy messaging appropriately.

"The COVID-19 Science Table has patient-friendly language versions of it that are there. Anyone could read that. It would explain their projections, explain the model, explain what they're seeing with different drugs, hospitalization, vaccine effectiveness in ways that people get"

Rural Community Outreach Worker, Canada

"The best stuff is the stuff that is clearly designed in a way that mirrors what people are asking about. Has it laid out in a way that doesn't have a lot of extraneous information…Something that's simple, something that's clear. Something that is structured and targeted in a way that gets right to like the stuff that people are most concerned about"

Physician, Rural Area, Canada

Written text formats on paper flyers and posters were perceived as remaining a vital part of reaching populations who didn't use the internet.

"For the less computer savvy or just for context where I want to have something that I can tangibly hand to, someone having a nice clean PDF. Ideally, something that can be on a single piece of paper and look clear. Double sided or just a single page has been really good"

Physician, Rural Area, Canada

"We had quite brightly coloured flyers, really showy flyers. We heard that really does not resonate. That's not something that would connect with some of the communities in our rural areas. Just simple straightforward, black and white, just to the point information is really what we needed to be giving"

Public Health Officer, Canada.

3.2.2.2. Oral communication

Beyond the written word, verbal communication was essential in both countries for communicating vaccine policies, recommendations and guidance. A range of public health professionals such as midwives, care workers, pharmacists and medical doctors implicitly engaged with the public to implement this in-person communication, alongside their regular duties. Others took defined, explicit communication roles. Professional associations were among those using webinars to provide education and offer opportunities to share ideas. Virtual townhalls, through platforms such as Zoom, were also commonly acknowledged as being helpful by organisations with resources available to deliver them. The use of radio and television yielded additional access to policy communication that was especially important to those who could not access virtual platforms. These could offer both interactive and one-way non-interactive communications.

"My role is providing people with information in layman's language but also in their language. I speak five languages, so my role has been basically on media like CBC, Omni, a bunch of Punjabi and other South Asian television networks doing Q&A sessions with people"

Ethnic Minority Physician, Canada

"We connected with radio stations that serve diverse populations and offer programming in different languages to make sure that messaging was getting out there."

Public Health Officer, Canada

Moreover, one government communicator expressed disappointment at not being given an opportunity to have personal conversations with people.

"There is one thing that I would like to do, that the government has never let me do, that is to sit in a room with about 12 people, not just on TV, and have a fireside chat with them, so they've got time to explore say questions they have and I have got time to explain anything they want and they can ask any question that they want instead of the whole two hours being available on broadcast"

Government Lead Communicator, UK

Greater face-to-face engagement of minority groups and communities through the pandemic was a strongly perceived need. This was recognised as a strategy to improve vaccine uptake to ensure all groups of society had an opportunity to ask questions about the vaccination rollout. Face-to-face communication was a valued

feature prominent at vaccination centres. Frontline staff described people answering detailed queries about the various brands of vaccines and how the vaccine worked in the body and what side-effects individuals might encounter.

"They will ask detailed questions, which is always good; they want to know how the vaccine works, and they want to know the differences between the vaccines. I have had very few people come in suggesting some wild anti-Vax theories"
Frontline Staff, Lincolnshire, UK

"We would get some, sometimes very interesting, detailed questions. like what was the PETA (People for Ethical Treatment of Animals) statement on the Pfizer vaccine? Was this vaccine compatible with a certain religious group - not a mainstream religion...someone was concerned with muscle ache or fatigue as a side effect as they had fibromyalgia"
Pharmacist, Urban Area, Canada

As in the UK, the primary health and social care interface was essential in providing information on vaccination and reassurance to individuals in Canada. A strategic decision to use public health units and private sector pharmacies to implement vaccine rollout also placed pharmacists in Ontario as key communication resources. The comments of these pharmacists illustrate the frontline role pharmacists took.

"We're sort of that final sort of assurance for people. They're coming in armed with a lot of information and I know they're getting that from the Internet and websites"
Pharmacy Manager, Rural Area, Canada

"It's community pharmacy. We are fielding everybody's questions up here. It's in the news first and then we go"
Pharmacist, Rural Area, Canada

The advent of the internet has prompted telephone communication to be somewhat overlooked, but interviewees also referred to it as an excellent way of reaching people. It frequently enabled direct, personal, private conversation between those looking for advice about vaccination and those with expert knowledge when public health restrictions otherwise made interactions difficult. This was crucial in the context of the population contacting healthcare professionals and resolving health concerns when many face-to-face services were closed or inaccessible for transportation reasons.

"We did a teleconference with all of the bishops and the ministry members for the old order Mennonite with our medical Officer of Health…. All of the bishops took a turn talking to us"
Vaccination Clinic Team Lead, Canada

Additionally, anonymous telephone calls to vaccination helplines were introduced later in the pandemic and it was noted that they created a better inroad into groups that were perceived to be vaccine hesitant.

“Some of the successful things we have done now. Doing them early on would have helped. We now have the Sick Kids’ Vaccine Confidence line, Scarborough Health Network has the Vax Facts line”

Ontario Department of Health Officer, Canada

These examples of spoken communication speak to the perceived value of brokering relationships between healthcare systems and individuals. This was felt to be the case in both the UK and Canada across people from wide demographics of age, race and culture. The significance of trust and inter-personal relationships on building vaccine confidence is discussed more fully in the later section about improving vaccine confidence.

3.2.3. Understanding and Interpretation of Communication

How vaccination policies were understood was influenced by the social, economic, political and technological framework they were presented in and audiences’ environments as outlined in the DOI model.

3.2.3.1. Technological advancement-vaccine approval

In both countries, trust and faith in the vaccines’ development were generally perceived to be high. However, some concerns were voiced about the speed of approval for COVID-19 vaccines.

In the UK, concerns captured in interviews related to the risk/benefit of taking a vaccine felt to have been developed in a hurry especially among younger adults. In addition, interviewees often mentioned that they believed the public had concerns about vaccine safety for pregnant women.

"I asked all of my team to get vaccinated. I only had two that were unhappy about that. They were both under 30. That changed the moment that the figures started showing that under 30s were also affected."

Hospitality Staff, Lincolnshire, UK

And then I think you've got genuinely vaccine-hesitant people because they're not sure on either the safety of the vaccines, we see a lot of that within pregnancy”

Vaccine Programme Lead, Lincolnshire, UK

In Canada, some concerns were expressed about the safety of mRNA vaccines, which were widely reported as “newly developed technology” in the media. Generally, there seemed to be acceptance that medical science had thrown every resource available at the problem and laboured to produce a vaccine fast. However, interviewees

perceived the general population as attributing concern to the use of novel technology that may have as yet unknown side-effects. In their experiences of talking to members of the general public, they encountered responses ranging from mild anxiety to belief in conspiracy theories. This is recalled here,

"I think the initial hesitancy that I encountered was just the fact that wow, we got a vaccine so fast… working through Health Canada's approval process for some of our more educated populations, people who have a university degree, their hesitancy was more about 'How can how can science evolve so fast?'"

Physician, Toronto, Canada

As illustrated by the director of communications above, it was felt people looked to the government for guidance initially. However, as the pandemic progressed, information became available from more sources. Caution about new technologies was also allayed by observations showing vaccinated people suffered few ill effects.

"We know that there are people that are coming around for the same reason that I hesitated in the beginning. It's like I need to see the people aren't falling over backwards. I need to see that baby being born is doing OK"

Pharmacist, Rural Area, Canada

3.2.3.2. Political considerations in the decision-making process

Policies about COVID-19 were viewed by sections of the population as politically motivated in both countries. Communications from governments, pharmaceutical companies and other entitles that were perceived to have vested private interests, attracted negative public perceptions. This was made worse with communications that instituted safety protocols such as travel restrictions and vaccine passports. For example, in the UK, young people did not appreciate mandates that restricted their travel and leisure activities as they perceived themselves as not at risk of dying from a COVID-19 infection. The perceived failure of vaccines to prevent transmission of COVID-19 reduced further reduced young people's trust in the underpinning "science" of the vaccination rollout, preferring to "rely" on their immunity.

"It is seen as the government telling me, I've got to do this, and I've got to do this for travel off, to go into a nightclub and because of that reason, I won't have the vaccine…

Vaccine Programme Lead, Lincolnshire, UK

Perceived political influence in vaccination policies was a key driver in dissatisfaction with policy implementation. Notably for ethnic minority groups, political transparency and trustworthiness seemed to play a significant role in vaccine decision-making. As the pandemic progressed, interviews referred to COVID-19 policies, including travel

restrictions and vaccination passes as politically motivated and biased, further hampering the adoption of vaccine guidance.

“I would be fully vaccinated by now, if they [UK Govt] did it in a different way”
Vaccine Hesitant Student, Nottingham City, UK

"Politics has really played a dangerous game in all of this. For instance, the decisions to put certain countries on red lists on non-red lists. A lot of people view the Red List of certain African countries as, racial apartheid"
Ethnic Minority Frontline Staff, Lincolnshire, UK

This was similarly observed with university staff, who noted that vaccinated international students were not given vaccination status in the UK, further suggesting a separation between how the UK government viewed international policies compared to how ethnic minority groups perceived international guidance.

"We have had this period where international students who have been vaccinated elsewhere, and their vaccines are not recognised in the UK"
Operational Staff, Lincolnshire, UK

Additionally, interviewees had mixed feelings on how well policies had been understood. Some frontline staff felt that although the initial vaccination rollout was well understood, the booster was less understood by the public, who were unsure about the rationale.

"Some of them don't understand the booster"
Frontline Staff, Lincolnshire, UK

Comparable observations and sentiments were noted by Canadian respondents. Mistrust of authority and government were perceived as influencing individuals’ interpretations of policies and their degree of vaccine confidence. Interviewees believed that scientists and medical doctors were widely perceived as more trustworthy than politicians or faceless corporate entities, implicitly having more expertise relevant to the pandemic and less self-interest in other issues that might influence policy decision-making. This is voiced by a community group leader.

“I'm not feeling at all like the politicians were providing me with good information. I got it from the specialists. I mean, epidemiologists……various people who are my pandemic heroes…. they were my canaries in the mine because they told me things before I was hearing it from anywhere else.
Public Health, from my perspective, is like the last on the list in terms of finding out everything”
Community Group Leader, Canada

Frequent references were made in interviews to transparency being an important quality required in policy decisions and that data arising from scientific studies was an acceptable determinant of those decisions. By contrast, once decision-making was more obviously influenced by political drivers, who were recognised as significantly different in depending on location, dissent and dissatisfaction with policy grew. Recommendations understood to be politically motivated were reported as unpopular. Notably, public health occupied a middle ground in interviewees' esteem, able to provide information and action, but sometimes slowed or hampered by bureaucracy and political bias.

"In Ontario…. political decision-making hasn't really been in tune with what the health care professionals are saying... the doctors were saying this, but… Doug Ford is doing that. So, what's really going on?.....for vaccines or mandates it should all be evidence based because your evidence for is pretty consistent…. we wouldn't have as much trouble; our policies are swindled by political decisions or pressures from business."

Physician, Urban Area, Canada

"It sometimes muddied the waters when the politicians weighed in because, people like to take opposing views, not necessarily, because it's good science or good information, or anything like that, just because it's coming out of a politician's mouth."

Pharmacy Manager, Canada

A law student who was hesitant to get vaccinated expressed his dissatisfaction with the government over the way advance procurement agreement were reached with companies that he did not trust

"In social, it's more like it's (Johnson and Johnson company) trying to just trying to make money. So like pharmaceutical companies trying to make money and I've done a lot of research on pharmaceutical companies that have made the vaccine and there's a lot in the past where they've made mistakes and they've done the same things that they've done now, so it's Johnson and Johnson for example. I mean, they changed their name in. I can't remember it as a quite a few years ago now, but I think I remember them changing their name and changing their company because they turned out talcum powder for babies, which actually cause cancer."

Vaccine hesitant law student, Nottingham

The impact of hearing advice from someone who was seen to have an objective point of view was underscored repeatedly by interviewees, indicating that this objectivity endowed trustworthiness on the message. Politicians and corporate entities such as pharmaceutical companies were perceived as putting their own needs first. Even a family member may argue the vaccination case based on their own agenda. Thus, trust in vaccine information and willingness to engage with the message could be supported by messages delivered by an impartial but scientifically informed bystander.

This was illustrated by the narrative of a long-term care home director who found adherence to vaccine recommendations improved when education was provided by an external healthcare expert.

"Someone who they felt was objective coming in and telling them added value. It wasn't me. It wasn't our nursing team. It was someone who was objective, who was well respected in the community."
Care Home Manager, Canada

Information about COVID-19 vaccination policies was frequently felt to be offered through the newscaster's lens of political agenda. Initially, the perceived paucity of information about vaccines in Canada led to media spaces being filled with the polarized news reporting from the United States.

"It was entertaining. So, I would have CNN on a lot because they are anti Trump and Trump was still running the show. Just the messaging that was coming from people like Fauci and also Cuomo and New York State because they were really one of the frontrunners in terms of "How do we deal with this?" and "What are we seeing?" and "What's going on?"
Community Member, Canada

As the UK, United States and Israel got mass vaccination campaigns underway, Canada waited for consistent vaccine supply. Political debate and criticism of the national vaccine rollout plan filled the waiting time. Concerns about vaccine availability were further confounded by mixed messaging about the efficacy of different vaccine types. Interviewees felt clear messages underpinned with arguments based on reliable, accessible evidence needed voicing. Moreover, a coordinated, unified position was called for across provinces, territories and advisory bodies to guide the public to confident acceptance of vaccine efficacy and safety. One nurse vaccinator described each province as "siloed" in their decision making, adding:

"When everything is so up in the air, the one thing we really need is consistent messaging. If NACI is saying one thing, and Health Canada is saying another and then Ontario does its own thing, that's going to cause people a lot of confusion and a distrust towards the system as a whole…. there needs to be a separate body that's comprised of members from all provinces and territories where they will set the same standards and guidelines."
Ethnic Minority Nurse Vaccinator, Toronto, Canada

3.2.3.3. Complexities of Recommendations

Operational staff expressed difficulty translating policies into easy-to-understand guidance and ensuring guidance was up to date with fast-changing policies. As such, some operational staff believed that regardless of how policies were communicated

and understood, it was still a personal choice for someone to decide whether to be vaccinated.

"I think, people started making their own decisions…so, I think that the message has got through and people do know what they need to do to stay safe"
Senior Operational Staff, Lincolnshire, UK

In Canada, some policy recommendations were perceived to be complex and/ or contentious. These included the concept of the "preferred" vaccine relating to recommendations for different priority groups to receive different vaccines, variation in the efficacy of different vaccines and unclear application of vaccine mandates.

As new data emerged from clinical trials and communication about levels of protection and side effects became available, preference for Pfizer-BioNTech mRNA vaccine emerged. As not all vaccines were equally available, "vaccine shopping", a term coined to illustrate how people would hunt around for their preferred vaccine type, emerged. With vaccine shopping came the added complication of people making multiple bookings for vaccinations that led to wastage in clinics and pressure on booking systems.

"There's a lot of people out there who think Pfizer is really the only vaccine that that they should be getting. I definitely see when we have Pfizer in we have no problem getting rid of it; when we have Moderna we have a lot more questions"
Community Pharmacy Manager, Rural Area, Canada

"Sometimes people reserved an appointment. If they were able to get it from a different source, they didn't always bother to go back and cancel the first one. I think that made the situation worse. If they had cancelled, somebody else could update in that spot."
Ethnic Minority Community Member, Canada

In parallel, government recommendations on preferred vaccine changed for different priority groups as more trial and population data became available. Frequent updates about vaccine suitability for age groups or health groups diluted the simple message. It could be argued that governments could not possibly predict vaccine efficacy and acquisition, so that policy adjustments to changing data were managed as best they could in an evolving situation. But had lessons been learned? Interview respondents with roles in communication and vaccine rollout were not convinced. The interpretation of policy about children's vaccine intervals continued to raise questions. Subtle differences in the NACI's recommendation wording, such as "may have" and "should have" vaccine, were considered to be rarely unpacked and fully understood.

Finally, the introduction of the directive recommending healthcare workers get vaccinated provided an example of how policy was misconstrued because of

ambiguous definitions. Vaccination mandates were marketed as a tool to increase vaccine uptake and protect vulnerable populations accessing health care. On that basis, advisory bodies such as the Ontario College of Family Physicians recommended their introduction. Apparently, fearing pushback from those who resented being told what to do, including unionised workforces, Ontario issued a watered-down mandate, Directive 6. Many interviewees felt this directive was widely perceived as unclear with respect to whom it included and was misleading to the public. Not all healthcare institutions or workers were covered. Hospitals went ahead with rigorous vaccination policies, but other organisations were left struggling to enforce a proposition clients often wanted but government wouldn't support.

"If you were a little community agency or a little primary care outfit, the problem is then you're setting vaccination policy for your staff without any back up from the government whatsoever; government bungled that by only having part of healthcare workers covered."

Professional Association CEO, Canada

Similarly, in the United Kingdom, there were growing concerns within the home care and care home sectors, which employ considerable numbers of ethnic minority groups about the implications of the health care mandates on ethnic minority groups who happen to have high numbers of minority ethnicities. There were equal concerns among hospitality staff about the sudden requirement to "police" people for vaccine passports before entry into some designated venues.

One lady who had worked as a care manager in both rural and urban Lincolnshire expressed her distress at the loss of two ethinic minority staff after vaccination mandates were introduced in the care home sector.

"Uh, so basically it was like in a village where the care home was and every single member of staff got vaccinated straightaway, but when I moved to the town Probably about 50% of the staff took the vaccination really quickly, and then there was some 'cause quite a lot of younger staff who obviously had concerns around fertility, but then then as the deadline (of the mandate) drew near, a majority of the staff decided to get it anyway but some two guys decided to leave rather than have it. We took them through the HR processes, one was so disgruntled and made several threats."

Care home manger Lincolnshire, UK

An employee in the hospitality sector when asked about the then propossed plan B option, pointed out the distress that was experienced by her staff while implementing government guidelines.

"I guess it was hard for the government to be able to put forward guidelines and policies. Because they had never experienced this before. But some of the guidelines were very, very difficult to implement. And, and they were just that they

were guidelines. So, we didn't have any authority, really, to ask our customers for example to wear a mask to social distance, you know, so it put the government very much put the ball back in businesses court to almost take all the costs and time associated with implementing the changes required to get back to being safe. And also, the policing of it…… I remember one incident on the animal farm when one man threatened our receptionist, he was going to jump over the counter and strangle her to death, because you'd asked his mobile number."

Hospitality and restaurant staff, Lincolnshire, UK

3.2.3.4. Trusting the Source

Trust in the source of policy information was perceived as critical in shaping people's responses and reactions to the messaging in both countries. Sources that were deemed to be credible enlisted more trust. This included health care personnel such as physicians and scientists undertaking independent research on the subject of COVID-19. Trust was also felt to be aligned within communities, therefore opinion leaders (community/religious leaders and associations leaders) inside them were more trusted than outsiders. For example, in each country, scientists were perceived as less likely to be influenced by politically driven motivations and to have consistent policy messages.

Individuals with strong belief in government authority often responded positively to vaccination guidance. In contrast, groups that felt marginalised from health systems prior to the pandemic were thought to need guidance from other sources to make an informed decision. The phrase "it is not what is said, it is who says it" was judged to underpin the response of ethnic minority frontline workers and those in their communities.

"Others are people who do not engage with healthcare services at all. So, for them, it was 'I do not engage anyway, I do not believe in vaccinations, so I am not engaging'. Moreover, others are 'right now, for me, it is not what I want to do'. They are not deniers; they are not anti-vaxxers, and they are not anti-government. They have made an individual decision for themselves to say, at this current stage based on what they believe not to have it at present."

Ethnic Minority Frontline Staff, Lincolnshire, UK

In Canada, as in the UK, the originator of communication as well as the channel used, added significant weight to the message. For example, while sections of the public trusted the mainstream media for accurate communication, some did not. Several of the interviewees spoke of their experiences with peers who were sceptical of the integrity of media sources and consequently wary of news coverage of promoting

vaccination. There was recognition that alternative media sources played with this uncertainty and provoked additional suspicion.

"People in the media that I trust, like Globe and Mail and CBC, those were the main ways that I was gleaning information"
Church Group Leader, Canada

"A lot of the mainstream sources they aren't the first people that people look to anymore, especially people that are vaccine hesitant or anti VAX. They are not going to take what CBC says or CNN or anything like that at face value"
Rural Community Outreach Worker, Canada

Also reflecting the situation in the UK, trust in religious leaders' voices was noted in Ontario. Such conviction in religious leaders' authority could either encourage or discourage people from getting vaccinated. When religious communities were additionally isolated from policy messages from other sources, they became particularly vulnerable to religious leaders' interpretation and vaccine hesitancy could and did emerge as a result.

"There's an innate distrust among religious groups, Christian groups, which is like 95% of all people in Grey Bruce… depending on your sect, how much your preacher talks about that, you're gonna have resistance to the government saying you should do something"
Rural Community Outreach Worker, Canada

3.2.4. Societal Responses to Communication

The varied public responses to COVID-19 policy communication are captured in three interrelated sub-themes: acceptance and resistance, frustration and fear.

3.2.4.1. Acceptance and resistance

Interviewees in both countries noted how the policy-making process, communication processes and policy content or even omissions had impact on societal responses. These factors enabled acceptance of vaccines for most, but also simultaneously created resistance to vaccination messages. The degree of resistance ranged from reluctance to get vaccinated to outright refusal, mirroring the phases described in the diffusion of innovation. Specific examples presented below demonstrate this in more detail.

In the UK and Canada, many people quickly accepted the vaccine across different sectors of society. Early adopters and those with vulnerable family members were impatient to receive the vaccination. Several interviewees expressed how initially, there was a sense of hope that vaccines could deliver freedom from restrictions and prevent the burden of illness. One faith group leader in Canada recalled thinking vaccine uptake would be strong and unquestioned.

"Initially, I was naive enough to think that nobody would say no to this miracle."
Church Group Leader, Canada

"Probably 80% of the workforce went and got the vaccine quite quickly."
Clinical Lead, Lincolnshire, UK

"And then there's been a separate group. You who could go negative because they want to be further up the queue. Who wants to be further up the queue? It doesn't matter whether it's more you know ordering, ,, I'm booking that vaccine by force. But then there will always be those sorts of people."
Government Communication Lead, UK

Whilst some people showed pride in what sophisticated, modern science could achieve, this contrasted with those attending clinics later, when less enthusiasm was sensed.

"At the beginning in March, everybody was extremely enthusiastic. They all were falling over each other to get in. By the time you got to June or July, you were getting the lagging edge of enthusiasm."
Health Educator and Vaccinator, Canada

There were clearly individuals who were happy to wait. As vaccination programmes continued, many of those more cautiously awaiting further data on side effects or who were prepared to shop around for preferred vaccine type, got vaccinated, as noted earlier. Some were swayed by the inconvenience of travel restriction policies or access to restaurants and leisure activities.

"It's always within those first three years in the market that they end up getting pulled if there's a problem. And so, I did hesitate. We just said if that's going to stop us from traveling, we don't care, Let's just get it!"
Pharmacist, Rural Area, Canada

Alongside expressions of acceptance or resistance for the vaccine, interviews revealed mixed reactions to those who were vaccine hesitant. As vaccination rollout widened, and infection rates climbed through a second, Delta variant wave, tolerance for unvaccinated people appeared to diminish.
In the UK, ethnic minority healthcare staff felt there was a strong social reaction to be intolerant towards unvaccinated individuals, often targeting ethnic minority groups. Their reported perception was that the public and other staff members believed in a correlation between vaccination status and social standing. For instance, an unvaccinated individual was viewed by colleagues as displaying deviant behaviour. These assumptions were made quickly without enquiry into the reasons for someone declining a vaccination opportunity. Therefore, for ethnic minority frontline staff, health

professionals' perspectives and societal responses were viewed as synonymous with the thought that "healthcare does not exist in a vacuum."

"If you are not vaccinated, you are a terrible person. However, you have no idea why that person may not be vaccinated. Is it health reasons? Is it religious reasons? Is that a cultural reason? It seems to be disproportionately affecting ethnic minority groups."

Frontline Staff, Lincoln City, UK

In addition, it was felt there were mixed perceptions from government staff as to the rationale for Black communities' reservations about vaccination. One research participant described how they felt the historical unethical vaccine trials endured by Black communities was not sufficient reason for current COVID-19 vaccine hesitancy.

"I don't get it with Black ethnic minority groups, and I don't get any of their reservations…unfortunately, they were very unethical trials in the USA and Africa in the 1950s. I don't think that is the reason"

Government Communication Lead, London, UK.

Similar expressions of intolerance and blame were made in Canada. Furthermore, the rush to roll out vaccinations was perceived to side-step collaborative, consultative work, which, by its nature, is a slow process. Regrettably, this led frontline vaccinators to feel some parts of society were overlooked in early planning stages when they could have been included. This was understood to increase feelings of neglect and mistrust in government and health systems. It frustrated and undermined efforts to increase vaccine confidence and subsequently contributed to a subtle resistance to or delay in vaccine uptake.

"They were very hurt not to have been involved in planning. If they had been involved they could have ensured that there were Indigenous immunizers on site. They could have organised drum circles. They could have put in a lot of cultural supports"

Vaccination Clinic Team Lead, Canada

The introduction of directives and mandates to increase the uptake of vaccines and slow the spread of COVID-19 variants, thereby controlling the cost and burden of COVID-19 infection, were highly controversial. Buoyed by safety data and evidence, Health Canada's campaign appeared designed to chivvy later adopters who would be moved by evidence that vaccination works. Strong recommendations, in the form of directives pushing healthcare workers and later transport workers to get vaccinated, were targeted at late majority adopters and traditionalists in essential occupations. Interviewees perceived these measures as stimulating vocal resistance from anti-authoritarian individuals, but overall delivering successful impact. The by-product of increasingly tight regulation was that freedom of individual choice provided a

respectable, political platform for anti-vaccination critics to argue from. Increasingly, societal response to the Public Health initiative became a question of politics as outlined by this doctor in Toronto

"The political aspect of it has increased hesitancy… transport workers say I don't want to be told what to do, and that's primarily the reason they don't want to be vaccinated."

Ethnic Minority Physician, Toronto, Canada

3.2.4.2. Fear

COVID-19 policy content and communication triggered reactions of fear and anxiety from some sections of the populations in UK and Canada. Fears originated from changing communication about side effects, poor clinical outcomes and the potential of health care systems to have insufficient resilience to face the growing pressure on limited resources. Alongside these fears, anxiety about loss of standing in community or reprisals made some people reluctant to take up vaccination opportunities.

In the UK, concerns about the capacity of the National Health Service were voiced from the start of the pandemic. Vaccination mandates were viewed as contributing to further reduction of capacity within the health system and widening existing inequities, especially for ethnic minorities in the UK. Ethnic minority staff expressed a distinct contrast in how COVID-19 policies were perceived by white British citizens and ethnic minority groups, often fearing how policies harmed ethnic minority groups more significantly than white British citizens.

"Things like mandating vaccination to NHS workforce…even an exceedingly small percentage of people leave the NHS… you are going to have a greater impact on the remaining workforce"

Frontline Staff, Lincolnshire, UK

In Canada, fear was captured in relation to concerns about side effects and vaccine safety. While some people described the context of historical harm, others' apprehension related to more recent COVID specific stories.

Understandably, fear about side effects needs assuaging, particularly when rare events have terrible impact and are highly publicised. One doctor spoke of the side effects suffered following a vaccination and how the understandable fear rippled through the patient's family into the community.

"There were some patients who had complications, [with] AstraZeneca, for example…they were very hesitant to receive another vaccine, regardless of it not being Astra Zeneca, just out of fear"

Hospital Consultant, Canada

A director of a charitable organisation also described how challenging it was to maintain trust and address vaccine hesitancy when safety claims were challenged by emerging data and highly publicised media coverage, evoking fear and concern.

"I remember the first few where that Astra Zeneca was safe and I had staff saying but I'm scared of it and we would have to say 'Oh, but it's safe, that's the messaging. Then of course you lose people when that becomes, 'Oh, don't use this anymore'
Director, Social Support Charity, Canada

The enduring fears about safety issues were understood to be a strong factor in maintaining vaccine hesitancy as described by the Rural Outreach Worker below. Many healthcare workers and outreach workers in both countries invested time in reassuring and educating concerned individuals. A rural Canadian pharmacist described how they regularly interacted with a hesitant couple and tried to overcome their fears.

"A lot of people left; they've heard a lot of negatives about it. It's not apathy, that's preventing them from getting vaccinated. It's not fear of getting COVID-19 that's preventing you from getting vaccinated. It's fear of the vaccine"
Rural Community Outreach Worker

"Both of these ones took a long time, like months, to make that decision. They were just afraid. They were afraid of what they were hearing. They were afraid of what they didn't know. They were more afraid of the vaccine than actual COVID. So it was just a very gentle, I wouldn't say prodding".
Pharmacist, Rural Area, Canada

Another university educator described how she went to considerable lengths with her students to spell out the relative risks of illness and complication when vaccines were declined and somebody contracted disease. This approach of explaining risk/benefit analysis was described by others, including front-line healthcare workers and those working with pregnant and lactating mothers.

"Now of course we have so much more information about how potentially devastating the consequences of the COVID-19 infection can be in a pregnant woman and how many of them ended up in ICU [Intensive Care Units]…my message would be less neutral and more encouraging"
Health Educator and Vaccinator, Canada

Vaccine safety fears also stemmed from historic injustices within the healthcare system and concerns that government's action to prioritise some communities was not motivated by improving their well-being. This perception was felt by healthcare providers and those less directly involved with the vaccination programme, for example providing social support.

"For some of our communities, some of our neighbourhoods, was it a testing ground? Were they being tested for chemicals that would alter things? A real lack of faith in our medical system, in our government"

Director, Children's Mental Health Non-profit Organisation, Canada

"There was so much fear with the Indigenous population being part of phase one and a lot of that historical trauma through the government testing it on Indigenous individuals. They were scared that they were just being used. Why are we phase one? Are we phase one because they want to test the vaccine on us? A lot of that historical trauma."

Vaccination Clinic Team Lead, Canada

Some contest fear about the vaccine has remained as much a reason to be unvaccinated as the fear of state control or preference for individual determinism. Indeed, some interviewees noted that fear has been used as a tool by government, media and society to shape reaction to the COVID-19 pandemic and vaccination.

"Initially it was fearmongering……the strongest message is to get the vaccination, that's our only protection right now"….

Ethnic Minority Community Leader, Canada

"The government has instilled such a huge fear" ….

Ethnic Minority Physician, Toronto, Canada

For some, fear of COVID-19 infection outcomes motivated a pro-vaccination stance, for example, with some older adults able to recall the impact of polio or other vaccine preventable diseases. The ethnic minority community leader and doctor quoted above felt Southeast Asian populations were also more amenable to authoritarian arguments instilling fear and promoting protection of whole communities. Pressure to conform to community-minded values was perceived to be strong.

However, there was a perception amongst other interviewees that fear was counter-productive, turning people away from communication channels and vaccination opportunities. Referring to her acquaintances, one vaccinator spoke of how media content was too emotionally trying and stimulated anxiety. This was echoed by a manager of mental health services who indicated those with anxiety disorders may be more likely to suffer challenging episodes.

"COVID-19 being something that's scary and has changed their routine has made them more anxious or more hesitant."

Health Educator and Vaccinator, Canada

Fear of reprisal, judgement and shame regulated responsiveness to vaccination messages. In the UK, pop-up clinics were set up to improve access and bring vaccinations closer to hesitant groups such as Eastern Europeans working in farms and factories in Boston, Lincolnshire. However, there were unintended consequences when highly hesitant groups from within these Eastern European communities started stigmatising and abusing their colleagues who accessed the workplace clinics. As a consequence, vaccination sites needed to be relocated to a less visible setting while still near the workplace.

"Within the different groups that work in the factories and actually, in particular, the Romanians and Bulgarians are very anti-vaccine in Boston. They were actually having an impact across all of the groups. It was causing significant problems for peer pressure and abuse within the groups that had started accepting the vaccine. So, you know you think you're going to put into action around this and that this is a great thing to do. Let's take vaccines to a factory."

Vaccine Co-Ordinator, Lincolnshire, UK

In Canada, conservative, orthodox Mennonite communities have had low uptake of vaccination opportunities in keeping with their religious beliefs that disease and suffering are part of God's divine scheme. More liberal Mennonites, who have opted to interact with healthcare providers, have preferred to take vaccines in discrete locations to avoid judgement from their peers.

"The Mennonite community don't like to get vaccinated in a public place where people can see them…. There's a lot of stigma and shame associated with people who are getting the vaccine."

Vaccination Clinic Team Lead, Canada

Similar problems of reprisal against, or detrimental judgement of those taking up vaccination opportunities were reported in urban Waterloo. The pressure to conform with community values is a fierce disincentive if those are aligned against vaccination. Those opposed to vaccination were prepared to manipulate others by challenging their conviction to religious beliefs to achieve their goals.

"A group of anti-vaxxers found out about a clinic, attended and were essentially harassing those who were waiting to be vaccinated. Some people felt uncomfortable and left.

Public Health Officer, Canada

"Anti-vaxxers would come in while people were waiting in line. They would shout out at them that the vaccine was haram, *which in in Arabic means bad"*

City Services Director, Canada.

It's interesting to note that there was a perception that disparity may exist between how people behave outwardly and their inward position to fit in with society norms. This reflects how policy and guidance may not dovetail well with all members of society. One community healthcare worker described how an Iman delayed telling his followers that he had been vaccinated having spoken against interventions previously. In another community, there was implicit pressure to follow the immunization norm, but social media fed unsettling sentiment behind closed doors.

3.2.4.3. Frustration

As discussed, COVID-19 policy communication aroused a range of emotions for varying reasons. Interview respondents frequently cited frustration at the ever-changing landscape of policy. The number and pace of changes and the complexity of information provoked much ire and exasperation among those implementing vaccination rollout. Those faced with mandates and directives from governments keen to push vaccination became indignant or angry about perceived loss of freedom. The slow pace of global vaccine distribution fuelled frustration and intensified feelings of inequalities experienced in some ethnic minority groups. Crowning all this was disillusionment that the promise of vaccines to deliver the population from the burden of COVID-19 infections and restrictions might not come to fruition. These four areas are expanded on below.

The people implementing vaccination rollout in both countries described how they were handicapped by frequent changes to policy and were left feeling caught unprepared and or uninformed of changes. This was a consequence of policy being communicated publicly without prior notice to vaccinators. It left vaccinators in challenging situations where they had to communicate complex policies, such as withdrawing elective surgeries, with little or no time to prepare.

"Healthcare professionals found information via the news rather than through official communication channels"

Frontline Worker, Lincolnshire, UK

The problem was amplified in Canada by the changes in policy arising from fluctuations in vaccine availability and the subsequent introduction of recommendations to extend dosing intervals or mix vaccines to provide full series of vaccine courses.

"The most infuriating thing during this pandemic was finding out about major policy shifts that we were expected to implement from patients, or from listening to the radio on the way home. Things being announced in public, a press release on Friday afternoon…I guess we'll have to figure out how we are going to do this"

Physician, Rural Area, Canada

"I spent the better part of my year pulling my hair out because, we would typically find out Friday night at 6:00 o'clock that policy was changing Saturday morning or that night or whatever …only to receive the executive notice to find out that something had changed in between our Intel and what the executive notice actually said…..it was already in the public's hands, but our pharmacists and pharmacy managers might not have been aware of it"

Pharmacy Manager, Rural Area, Canada

Some sections of society sensed freedom slipping away with each renewal of public health restrictions. The introduction of directives and mandates to slow the spread of COVID-19 variants and control the cost and burden of infections was particularly contentious for people who felt that their civil liberties were being eroded. One independent expert in health communication pointed to how choice of language in policy could potentially ease the resentment ready to boil over.

"It was very interesting to see the political polarization in the use of language around passports...With certain organisations we had to adapt and use different terminology to explain what we were trying to implement or recommend"

Independent Health Communication Expert, Canada

In parallel with the dissatisfaction of authoritarian measures, the perception of government inconsistency and limited commitment to share vaccines globally, especially to low- and middle-income countries, also fuelled disenfranchisement within Canada.

"My partner is Indonesian and he is telling me how hard it is for countries like his country and other third world countries or developing countries to access mRNA vaccines when I'm seeing all these wealthy first world countries holding on to this quantity of vaccines and then have it expire, it really infuriates me."

Ethnic Minority Nurse Vaccinator, Toronto, Canada

This happened as assumptions and judgements were increasingly being made about unvaccinated people. Interviewees noted that vaccine-hesitant individuals were perceived negatively in healthcare systems in Canada and the UK, presumed to be part of the burden threatening to overpower health systems or responsible for delayed elective procedures. Healthcare professionals interviewed felt this frustration was a consequence of how policy was being communicated and interpreted.

"Sometimes you will get health professionals making comments, and it is like, in no other health situation, would you be so judgmental about someone's personal health choice. In no other sort of illness or disease do we classify somebody who says, 'right now, I do not want to engage this as an anti X Y and Z"

Frontline Staff, Lincoln City, UK

"I believe this way of thinking "unvaccinated are bad" is reflective of the inconsistent policies during the pandemic…When a government announces that all healthcare workers should have a mandatory vaccination, they should also back that up by 1, indicating that it is not only protecting patients but the workers themselves. 2, be consistent, don't change the rule right before the policy comes into effect. This fuelled anti-vaccine sentiments and also the perception that non-vaccinated people are a burden. Health policy should also work to advocate for those who are unable to be vaccinated, those who have legitimate reasons or are under investigation; we should be working to protect them as well through consistent public health guidance."

Ethnic Minority Physician, Toronto, Canada

In Canada, while evidence exists for a strong positive response to vaccination recommendations, failure to maintain a clear, honest narrative about what vaccines can and will deliver is perceived as causing disillusionment to some. This frustration makes fertile ground for arguments used by anti-vaccination campaigners. Contentious issues include how the evolution of novel COVID-19 variants has shifted and what can be obtained through mass vaccination programmes.

"The vaccine was gonna end it, whether or not they explicitly communicated this. This was in people's minds, they feel like they've been lied to about the vaccine….. the vaccine was the way out and all of a sudden now, it isn't the way out completely, back to normal."

Rural Community Outreach Worker, Canada

Over time, the societal response to COVID-19 policy has become a mounting weariness. Some of those who didn't opt for early uptake of vaccination have been swayed by assurances presented in vaccination campaigns, convinced by seeing others survive or they have been pushed by mandates and restrictions into getting vaccinated. We turn now to specific community level interventions and examine what has helped improve vaccine uptake for specific groups.

3.2.5. Community-level interventions to improve vaccine uptake

Throughout the pandemic, public health professionals drew on established contacts, pathways and sequences for increasing awareness about the issues of COVID-19 infection and preventative measures. Leading into COVID-19 vaccination roll-out, these routes were revisited to help communities engage with information about, and the practicalities of, receiving vaccination. Through the guided interviews, research participants gave their opinions on which community-level interventions were most successful and why.

3.2.5.1. Focused Outreach

In the UK and Canada, specific outreach efforts were made to accommodate the diversity of each country's population structure. Consideration of the norms and values

within each person's country of origin was viewed as essential and many adaptations to implementation plans were undertaken. For example, in the UK, programme leads talked about how vaccination campaigns aimed at the eastern European population in Lincolnshire factories did not initially work due to Bulgarian, Polish and Romanian populations being grouped together rather than seen as distinct communities with different opinions about the vaccine. Minority groups were viewed by some frontline staff as being less trusting of health care due to negative past experiences.

"When we took the vaccine to the factory [there] was actually some discourse within the different groups that work within the factories…So, you think you're going to put an action 'let's take vaccines to a factory'. But we didn't understand the cultures, values, and beliefs in that little micro group of individuals working at the factories."
Vaccine Programme Lead, Lincolnshire, UK.

In Canada, Public Health units bolstered efforts with established community engagement groups to assist with effective targeting of different cultural and religious communities. Identification of neighbourhoods with low vaccination uptake was partly driven by analysis of public health records, including school immunisation programs, and demographic information such as residency status. Community engagement working groups acted collaboratively to find gaps in knowledge about vaccines and, or barriers to accessing immunisation programs. This discovery process was facilitated by interactions with other public services (city and regional councils, school boards), local non-profit organisations providing health and social care services and primary care practitioners. Consultative and collaborative actions were then undertaken to provide appropriate information and ways of accessing vaccination.

"Tasked with helping to ensure that the vaccine rollouts into communities were equitable and used a community lens in the delivery of programs. We worked to make sure information was being shared and was accessible so that people can make their own decisions about the vaccine. Just getting accurate information out to the community as broadly as possible."
Public Health Officer, Canada

Several common strands emerged from these efforts to support different communities; the importance of trusted relationships, culturally contextualised healthcare provision, opportunities for individuals to ask personal questions and receive answers and education from well-informed, though not necessarily medically trained individuals.

3.2.5.2. Cultural adaptations

Cultural awareness means taking time to listen and adapt messaging so that it covered areas of concern. During vaccine rollout, it also involved understanding the root causes of hesitancy by holding conversations with diverse groups of people. Community champions were found and suitable means of communicating vaccine related messages in the most appropriate languages were determined. This was

perceived as increasing trust and acceptance of messages, given the legitimacy local community leaders and champions enjoyed in their communities. It also helped diffuse some of the patriarchal, done-to-us sentiment beginning to circulate.

In the UK, dealing with inequalities that exposed people to more risk was undertaken. For example, communications were translated for minority groups to increase access to information and the accessibility of various neighbourhood clinics was increased. Indeed, some health professionals felt it was vital that given the significant amount of time, resources and funding invested in the vaccination response, the learning and experience about tackling health inequalities should be translated into long-term benefits beyond the pandemic. They expressed the need to continue to work collaboratively with community members and local groups.

"So, I think the important message to get across is this work should not just be solely for COVID-19; it should be expanded into other areas and into health promotion. We can see it as a starting point. Now we have built these really strong communities. Let's widen this, let's reduce inequality within all our work."
Public Health Professional, Nottingham City, UK

Also, interviewees reflected that social media worked well with younger and digitally literate audiences. Online discussion forums via video conferencing software such as Zoom were another tool used to get groups of people together, as well as face-to-face events at community venues, such as local businesses, retail outlets, sports and leisure venues and places of worship. Using trusted and recognisable local people such as high-profile community members, professional sports teams, religious leaders, healthcare professionals from groups prone to vaccine hesitancy to co-produce materials and messages via videos was deemed an effective way to promote vaccine uptake. It was recognised that when public health professionals were partnered with local community champions to promote uptake, there was greater impact.

"It might be talking to community champions because we know they're in touch with communities and can get the message out, you know far better and more successfully than perhaps we could ourselves."
Public Health Professional, Lincolnshire, UK

"You know, minority people congregate and you can reach them easily as a group but not as individuals, they lack trust.There you will see the problem you do not know. How do you get people to behave the way you want them. Just using media does not cut it. You know self-preservation kicks , does that person really like me? I know he may be talking from a point of science, the government may have good intentions but people read meanings,.. being in the government does not make you a good communicator pushing your agenda down on others. The problem is the problem is who is making that decision or who is speaking about that information."

Minority ethnic lecturer in Journalism, Lincolnshire, UK

In Canada, interviewees also identified Ontario as a multi-cultural environment whether they lived in rural or urban areas. Many spoke of language barriers to sharing information and the importance of translated media. There was acknowledgement that official information relating to pandemic policies was provided in English and French first, ahead of translations. Crucially, this gap provided an opportunity for alternative, unofficial communicators to engage with people, one not overlooked by those critical of pro-vaccination messages. One community health facilitator indicated that her immigrant patients looked to communication channels available from their home territories and in native language over Canadian sources.

"A lot of the information they get are from their news channels, directly from India, from Pakistan or wherever they're from. A lot of the information from there doesn't actually coincide with what's happening here… the rigorous testing that happens here, is not the same process that happens there"

Ethnic Minority Physician, Toronto, Canada

As this quote highlights, facilitator, who happened to be an ethnic minority physician, saw herself as performing a dual role, providing both health and cultural support to patients with whom she spoke. She reflected on how encouraging it was when the language barrier was bridged and more translated materials became available, not least because more complicated, nuanced information could be delivered. This was a sentiment support by others as well.

"The other thing, that's been very positive, is we've been providing it in their languages, providing the information. A lot of people are English as a second language here, and I think we had talked top five priority languages where the literacy rate in English was like 30% for example."

Ethnic minority Physician, Toronto, Canada

"At the clinics we had, one of the nurses mentioned that someone teared up when they got a piece of aftercare information their own language"

Public Health Officer, Canada

Interviewees noted that successful cultural adaptation meant more than language translations. Providing detailed descriptions about the composition of vaccines in ways that could be easily explained by community champions was constructive. For example, information was appreciated on whether adjuvants and stabilisers in vaccines met *halal* rules. Providing information about how vaccination could align with holistic healthcare and other lifestyle choices was facilitative too and demonstrated respect for others' values and ways of life.

"Some of the barrier for vaccination was what the content of the vaccine was. So many of my Muslim community could get Pfizer, but they couldn't have Moderna because of some content. Once we could have someone explain that to us and understand that, then we could start to message differently."
Director of Services, Non-profit Organisation, Canada

Community champions were an asset for maximising opportunities to broker new relationships as well as improving established community links. Some organisations were proud of their diverse workforce and were quick to deploy them as illustrated by the public services director below.

"Sometimes we would lean on our staff who spoke Arabic to give the Arabic information to people so that they could kind of either read what it said or create that connection."
Director, Public Services, Canada

It was felt a power balance shift began from these examples of where community champions made a difference. Service providers became increasingly more willing to uncover, understand and alleviate barriers to accessing clinics.

"Engaging groups who are self-identifying as folks living with barriers of racism and wanting to make sure that their peers and folks with shared experience to them aren't being left behind due to misinformation or lack of access…lack of trust."
Director, Social Support Charity, Canada

"Meet them around what's the priority in their mind…cultural or social barriers they want to talk about...meeting them where they're at and then starting to understand why they make the health decisions that they do."
Outreach Communications Expert, Canada

Cultural cues and common language were influential tools for bridging the gap between mainstream healthcare systems and individuals with different backgrounds. However, deeper enquiry into the barriers behind vaccine hesitancy revealed the grave implications of failing to establish trusted relationships with minority communities.

3.2.5.3. Accessible clinics

Varied models of accessible clinics were implemented in UK and Canada to increase uptake of COVID-19 vaccinations. These included pop-up mobile clinic buses, making specific accommodations for privacy and offering entertainment and snacks while people got vaccinated.

In the UK, vaccination buses were used in both rural and urban areas to reach hesitant vaccine groups and those unable to travel further afield for clinics. For example, a

public health professional in Nottingham commented on a successful strategy to engage with the Gypsy and Traveling community. They maintained that these buses were not used solely for vaccinations but first for information to break down barriers and to have a nurse available to answer questions. They would then return later to provide vaccinations.

"We got our vaccination bus to their site, and we were able to vaccinate them Gypsy and Traveller Community, which is a massive breakthrough for us."
Public Health Professional, Nottingham City, UK

Poorer and more racialised areas had poorer access to healthcare in general. Therefore, efforts were needed to ensure that people were not expected to pay out-of-pocket to accessing the vaccine, such as by missing paid work or needing to pay for a taxi to reach a distant clinic. Pop-up, and mobile vaccination clinics and support with public transportation such as buses were deemed essential in these areas.

"There is a constant refrain from people, particularly on the East Coast of Lincolnshire that they are being ignored and that everything is happening in the city [Lincoln], 'nothing ever happens in our community,' so, we need to show communities that there are vaccine clinics near them, sometimes you have to take the services to the people."
NHS Staff Redeployed to Support the Booster Programme, Lincolnshire, UK

"Within the different groups that work in the factories and actually, in particular, the Romanians and Bulgarians are very anti-vaccine in Boston. They were actually having an impact across all of the groups. It was causing significant problems for peer pressure and abuse within the groups that had started accepting the vaccine. So, you know you think you're going to put into action around this and that this is a great thing to do. Let's take vaccines to a factory."
Senior Nurse and Vaccine Co-Ordinator, Lincolnshire, UK

Vaccines were also administered to people in cars to help with psychological conditions such as a phobia of needles who did not want to receive the vaccine in a public setting or felt more relaxed away from crowds. While this was successful with increasing vaccine uptake; it was also very resource-intensive compared to other vaccination sites.

"We have struggled with people with mental health issues, sometimes we've got people to the site five or six times. If they are needle phobic, they get as far as the site and then. They don't want to have it, so we've had to communicate quite a bit with them to let them know we can do some in their cars so that they don't have to come out."
Healthcare Manager working with Primary Care Networks, Lincolnshire, UK.

In Canada, successful interventions to facilitate vaccination in communities where government distrust was rife included so-called low barrier clinics. These clinics had fewer requirements for interaction with government or health authorities than regular clinics since they didn't require prior registration in information governance systems. They were perceived as being productive in supporting vaccination amongst homeless and under-housed people, those with substance use disorders and some urban indigenous people.

"So, we are doing low barrier clinics in the area where we set up our harm reduction trailer. Low barrier means they do not need appointments; they can just come down and we would be more than happy. No ID required, nothing"
Ethnic Minority Community Health Manager, Canada

Other efforts included trying gift cards or cash incentives as an additional enticement to attend vaccination clinics, as well as the use of pop-up vaccine clinic buses. The one-off gifts were seen as less alluring than genuine attempts made to invest in wider health and social care provision, such as opportunities to interact with other community members and healthcare providers under one roof. They also had more potential to build positive relationships and promote long-term health outcomes.

"We did wellness hubs for Black population…. it was a fun space where people can come, have some snacks, there was music and then we were trying to connect them with a different sort of provider. We had primary care, we had mental health support, we have harm reduction…A clinic or event where people can connect with any kind of health care providers"
Ethnic minority Community Health Manager, Canada

3.2.5.4. Creating spaces for dialogue

In both the UK and Canada, creating spaces for dialogue with members of the public that had questions about the vaccines was vital in building confidence in the vaccines. These spaces were created online using town hall-style meetings or presentations with discussions. Discussions were also held over social media. As described already, telephone information lines contributed to open dialogue and, where possible and appropriate, in-person meetings were undertaken with subject experts, healthcare professionals and public health officials.

Interviewees often mentioned that they needed to consider their communication style as well as the wording they used to articulate vaccine-related messages. They stressed avoiding "telling people what to do" but rather inviting them to make an informed decision was most successful. One UK participant, who was working on the phone lines to support the rollout of the booster programme, commented on their welcoming and engaging approach:

"Yeah, I mean my entire life. I've always kind of started phone calls with good morning or good afternoon and really trying to start a conversation in a nice way. So, no matter what that person is facing at home, they feel like they want to talk to me, whereas I feel like I have received phone calls from health care professionals, and it is very monotone scripted, and I don't think it always makes you want to talk to them or answer that private call the next time"

COVID-19 Booster Phoneline Staff, Lincolnshire, UK

In Canada, one of the key features of raising vaccine confidence described was the importance of offering individuals opportunities to test their understanding of how vaccination would work for them personally, to be able to ask questions framed by their individual circumstances and have concerns heard. These conversations were undertaken in a variety of circumstances ranging from private consultations with healthcare professionals to open questions in virtual town hall meetings. Speaking to a healthcare professional with whom an individual had previously established a relationship was frequently cited. Prior interactions laid the groundwork to build trust upon, thus advice or guidance around vaccination was given greater credence. Crucially, discussions were best regarded when their circumstances were viewed as non-judgemental.

"Some of the most effective [messaging] is still through a trusted health care provider having those providers able to give the more thorough answers is really helpful."

Ontario Department of Health Officer, Canada

This kind of intercession is resource heavy, but the outcome of one-to-one discussions is more informed decision-making. Ripples of information and trust radiating out from discussions can also be of benefit. The newly informed individual can become a tertiary source of vaccine guidance, potentially cascading their knowledge outwards and onwards. Tools that support this process by providing digestible information and education helped build vaccine confidence. Education was seen as a more empathetic, humanistic way of approaching hesitancy, a soft tool compared to authoritarian instruction or mandate. This is expressed by two frontline workers here and reflects the sentiment of the UK Vaccine Booster telephone line operator.

"It was a Q&A, something where you can come with questions, and I'll try my best to answer them. I'm not gonna lecture to you. I'm not here to judge you. [I told them] at the end of the day, if they didn't get vaccinated, that's fine. They left feeling more informed. That's what I'm happy about. If they left with a better understanding of the pandemic, they left with less fear about things. If they left with the information, they need to make that choice"

Rural Community Outreach Worker, Canada

"I've been doing a lot of myth busting and I'm addressing their concerns and actually even calling patients back if I don't have the information then and giving them information. Empowering them with information, people are very understanding if you empower them with education"

Ethnic Minority Physician, Toronto, Canada

3.2.5.5. Education Opportunities

One final recurring element is how education can make a difference in whether a person feels they can trust an innovation. While many framed their queries in terms of personal medical history and cultural or religious contexts, a contingent sought better explanation of the science or data they had heard. They wanted the facts about everything from local numbers of the infected, so as to engage with the seriousness of COVID-19 infection, to statistics supporting the efficacy of vaccine protection, to epidemiological models projecting future impact on healthcare systems. Perhaps not surprisingly, this information was perceived as being hard to understand – often being left to single-issue experts - and seldom reported in the media. One interviewee commented that "they underestimated the ability of the public to understand things, and they overestimated the public's ability to acquiesce to the request" (to get vaccinated). It is important to acknowledge the impact of those who researched and explained concepts clearly and translated and interpreted ideas. This point especially would indicate the necessity for more transparent and accessible information to support policy decisions.

"I'm having conversations about whether COVID-19 is really that bad, or sceptical about the safety of the vaccines. Having Ontario specific epidemiology data and Canada specific data and numbers of hospitalised patients, numbers of deaths in different age groups vaccinated versus unvaccinated, that seems to have really resonated with people"

Physician, Rural Area, Canada.

These observations illustrate how the chain of communication is enriched as it is disseminated and how important it is to provide satisfactory supporting materials for educators and implementors around policy, detailing its foundations and objectives.

3.3. Discussion of Qualitative Interview Findings

More than 60 interviews were conducted across rural and urban areas of the East Midlands and Southwest Ontario to explore how COVID-19 vaccination policy was communicated, understood and implemented. Participants were drawn from varied backgrounds and had had diverse experiences professionally and socially throughout the pandemic. Qualitative research interviews were interpreted and reported here with reference to how policy was communicated and understood alongside societal

responses. In addition, efforts to distil policy and improve vaccine uptake were described.

Common themes of access, education and relationships ran through the interviews in both countries. Clear, reliable, and credible information was identified as key to building trust. But interviewees in both countries noted that high-level policy updates often came at the expense of clarity in frontline vaccination efforts. Policy makers need to be mindful of the recommendations they develop and modify, including the frequency of policy changes or updates. The complexity of the vaccine policies meant that the vaccine guidance was often unintentionally misinterpreted, but the changes also meant it was easier to misdirect or misrepresent policy intentionally. It was also critical that policies were communicated with authentic, ethical statements about what vaccines could and could not deliver. The backlash against the perception of “broken promises,” such as vaccines ending the pandemic, challenged relationships among public health officials, vaccination programmes and communities. Instead, interviewees felt a need for consistent, transparent narratives around what immunity is, how it can be achieved, the potential risks and benefits of public health interventions and how to address ongoing areas of uncertainty.

Vaccine confidence was supported when individuals were encouraged to take time to discuss the implications of vaccination versus remaining unvaccinated in a personal context. Supporting this observation were reports of successful vaccination outcomes when cultural concerns were allayed by the presence of communicators who spoke a similar language and/or who had a common cultural background. The quality of relationships had direct impacts on trust, which was imperative for later adopters to feel confident in taking up vaccine advice at both personal and administrative levels. This underscores the need for ongoing investment in public health outreach work that promotes good rapport between communities identified as having low engagement with vaccination.

Alongside vaccine confidence, equitable access to vaccines was perceived as an empowering lever in augmenting vaccine uptake. Late majority adopters were often enabled rather than persuaded into vaccination. Each country mobilised clinics and began repurposing local venues to expand vaccination opportunities, often adding additional enticements. Access was understood as more than hopping on a vaccine bus or being offered a snack; how a respondent had previously experienced the long arm of government could affect whether they decided to be vaccinated. Targeted, detailed information was thus perceived as essential, as were translations in multiple languages. There were equal calls for availability of materials with simple messages and appropriate reading levels. A picture emerges of many purposeful instruments used in multi-channel communications underpinned by a common theme; to inform decision making rather than to demand it.

One limitation of this qualitative analysis is that we had limited reach into highly vaccine hesitant groups. The perceived barriers and concerns that we describe in this report represent the perspectives of people interacting with vaccine hesitant individuals, including what did and did not work to reach diverse communities. However, research is needed to better characterize the perspectives of individuals who are vaccine hesitant, to distinguish between efforts that improve access, such as mobile clinics or language translation and interpretation, compared to efforts that address hesitancy or vaccine mis/disinformation. Our findings highlight how most efforts focus on addressing socioeconomic barriers, such as language, education or transportation, rather than countering anti-vaccine misinformation and disinformation that may be prominent in a rural, ethnic or racialised community. In fact, the interviews highlight that the latter barrier is a far higher bar and that many vaccination outreach efforts highlighted how vaccine information is both globalized and deeply rooted in community and culture. For communities that had prior relationships with public health or community healthcare services, it was easier to bridge the gaps. However, for communities where there was little to no prior relationships, efforts to bring vaccines uncovered complex community relationships, diverse actors and global influences. This observation has powerful ramifications because easy access to and adequate education about vaccines and vaccination were potent enablers of uptake in communities viewed as having slow adoption rates, but longer-term relationships that recognized community diversity and autonomy were needed to make the biggest impacts.

Finally, governments have also been criticised for insisting on proof of vaccination for work and leisure activities. The conclusion of qualitative analyses in both countries is that vaccine passports and mandates increased vaccine uptake but frustrated employers, employees and the clients they served when regulations were poorly conceived and delivered. Clear inclusion/exclusion criteria were seen to be critical, with clear endorsement and firm deadlines. Most of all consistent, transparent rationale in keeping with other policies needs to be upheld.

Methodological reflections

Study strengths included the collection of views across a broad range of participants spanning different occupations, neighbourhoods, local authorities and ethnic groups, and presentation of the results to community members to ascertain how well they resonated with them. The study approach ensured that the results are trustworthy and are transferable to other settings. Key limitations included difficulty in recruiting vaccine hesitant individuals and difficulties engaging with ethnic and religious minorities who often preferred to be represented by their trusted community leaders. Whilst this was a limitation, it provided insights into approaches to engaging ethnic and religious minorities in research.

3.4. Summary

The qualitative findings on how policy was communicated in the Canadian study described a communication chain from primary government sources, through secondary actors such as local public health officials or community group leaders, to tertiary audiences, such as healthcare providers. There were many opportunities for contextualisation and nuance to be added to primary messages, much of which was required to enable vaccination programmes and strengthen public health measures. A variety of media and resources were used to lengthen the reach of communication and strengthen pro-vaccination messages by countering barriers to information or misinformation.

4. Key messages and implications of our findings

Since Canada and the UK align culturally in many ways despite differences in policy detail and communication, commonalities within the results are not surprising. The policy analysis shows how both countries used a top-down approach to policy making, with high-level policy actors developing policies that were then adapted or adopted by local policy actors, such as provincial or regional governments, and then interpreted by public health workers, healthcare providers and community leaders. But this top-down approach, while efficient for policy making, made it difficult to implement vaccine policy on the ground. The policy analysis showed the frenetic pace of change in vaccine guidance in both countries, owing to rapidly changing variables such as infection rates, vaccine supply, vaccine research and emerging variants of concern. But the interviews show how the subsequent layering of updates were difficult to implement where it mattered, hampering vaccination efforts and continuously challenging outreach efforts, trust building and transparency.

4.1. Building trust in COVID-19 vaccines

One key element was that the two countries had different geographic, economic and political landscapes, which prompted significant variations in implementation policy for mass vaccination programmes. In Canada, vaccines were procured and distributed by the federal government, and national bodies provided policy guidance, but responsibility for developing vaccine policy was delegated to the provinces and territories. Canada, which is often described as having 13 health systems, thus had 13 vaccine policies. This delegation meant that community members received policy information at a national, provincial and local level, which led to disparities perceived in messaging. Furthermore, Canada, unlike the UK, was not a producer of COVID-19 vaccine, meaning vaccine scarcity informed policy decisions. Scarcity-related policies related to dose intervals and mixed vaccine protocols inflamed communication issues and led to questions about authenticity of data and trust in government.

One example of the impact of frequent policy change on frontline vaccination was translation efforts. While policies were made at higher levels of government, local governments, public health and healthcare workers were responsible for interpreting the policies for their local citizens. These efforts often included the development of high-quality information sheets translated into multiple languages. Repeated policy changes meant it was difficult to develop and maintain these critical tools and keep them up-to-date, which added costs—both time and money—but also left actors to source lower quality translation services or to delay the translation of materials. The constant changes also led to difficulty in communicating policy to communities at higher risk of COVID-19 infection, which then contributed to confusion about individuals' eligibility and suitability for vaccination. The complexity was attributed to several factors such as the prioritization frameworks, vaccine brand availability, vaccine intervals, emerging variants of concern, waning immunity and

mis/disinformation. These multiple competing factors forced vaccine programmes to be reactive rather than proactive, making it difficult at times for vaccination programmes to offer the right vaccine to the right people at the right time.

One solution is to implement simpler policies at the expense of relationship and trust building. The UK appeared to adopt that approach when it developed a prioritisation framework that focused on age as a risk factor. Canada did as well and both countries also prioritised frontline healthcare workers. However, Canada's prioritization framework was developed in the context of the Black Lives Matter movement and amid ongoing truth and reconciliation efforts with First Nations, Métis and Inuit communities. Thus, Canada's framework was more nuanced and difficult to implement, but it reflected a growing awareness of the role of systemic racism in health disparities. Both approaches were heavily criticized and tested government relationships with their communities. Ongoing strained relationships also led to uncertainty and confusion among marginalized and racialised populations about why they were being prioritised when this had not historically been the case. Further, many of these groups were not consulted by policy makers, highlighting how inclusive policy cannot be made in a vacuum, but rather through long-term efforts aimed at building autonomy and trust within diverse communities.

This report shows how mistrust in government and healthcare systems can be seeded or reinforced by rapid policy change at the expense of clarity. One lesson learned is that policy changes, even emergency policies, need to be clearly justified, and that the repeated refining of policies to optimize an outcome may have unintended costs and consequences that may not be visible to policy makers.

4.2. Diffusion of innovations & COVID-19 vaccines

Vaccine confidence is a key characteristic governing individuals' acceptance of vaccination. The diffusion of innovation theory was used to inspect societal responses to vaccination policies. In both countries, the policy analysis clearly identified a top-down approach to developing vaccine policy satisfied most of the population. Early efforts focused on access, including prioritization policies that aimed to vaccinate those at highest risk first. These policies were complex but aimed more to restrict access than to promote it. This meant that the first several months of the vaccine rollouts in both countries focused on meeting the vaccine demand for groups that had faith in scientific arguments and could clearly identify a benefit to vaccination. However, the interviews were better able to highlight how top-down vaccine policies that focus on access may have come at the expense of later adopters, who were less connected with policy makers. As discovered by many interviewees, later adopters needed to be supported to access vaccines, but they also needed to see how the vaccines were providing others with clear benefits and to understand how the vaccines aligned with their values and beliefs. As a result, later in the vaccine rollout, vaccine

programmes relied more heavily on multilingual communication and mobile clinics but the constantly changing policies made it difficult for later adopters to decide about the vaccines. For these latter groups, relationship-building and directed information about vaccine content, side-effects and personal benefits, rather than population benefits, were helpful. Certainly, vaccine mandates and passports had some impact in this latter group as it tied vaccination to employment and access—a finding consistent with the diffusion of innovation theory, which posits that later adopters may accept an intervention if not taking it will lead to the loss of something rather than a gain. However, even though mandates and passports may have led to vaccine uptake, they may have also lowered vaccine confidence hesitancy among those most resistant to vaccination. The mandates also disproportionately affected ethnic minority groups working in the care sector who had to choose between their firmly held beliefs and their work.

4.3. Conclusion

Ultimately, this report highlights that robust vaccination policy needs the engagement of communities to be accepted by them. As was noted in our qualitative interviews, “It is not what is said, but who says it.” For policy makers, the diffusion of innovation model demonstrates how efforts to ensure vaccine access are distinct from efforts to ensure vaccine uptake. Early wins from policies aiming to get doses into willing arms may come at the expense of trust, meaning later adopters are forced rather than convinced to accept vaccines. While there are clear shorter-term benefits to promoting high vaccine uptake in a pandemic, it may lead to unintended consequences with future vaccine programmes. Thus, it is critical that there is ongoing support for community-level efforts that aim to build trust and the engagement of marginalized and racialised groups in policy making. It is also critical that policy makers consider the unintended consequences of frequently refining and optimizing vaccine policy. This will likely require a major shift in the systems used to make policies, including who sits at the table with policy makers, but a change of this magnitude can have much greater long-term benefits in areas far beyond pandemic vaccine policies.

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