

# Pediatric Vaccine Hesitancy in British Columbia

A systematic analysis of COVID-19 vaccine uptake amongst eligible pediatric populations in British Columbia



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# Table of Contents

<b>Introduction</b>	<b>2</b>
Executive Summary	2
Motivation and Positionality	2
Research Methods	3
<b>Challenge Landscape</b>	<b>3</b>
Defining Vaccine Hesitancy	4
The 5C's of Vaccine Hesitancy	5
Who has the Power to Create Change	5
Root Causes	7
Role of Trust	8
Gap #1	9
Gap #2	9
Gap #3	10
Gap #4	10
<b>Solutions Landscape</b>	<b>11</b>
International Solutions	11
National Solutions	12
Provincial Solutions	12
Local Solutions	13
Science as a Maverick	13
<b>Stakeholder Action</b>	<b>14</b>
Intervention #1	14
Intervention #2	14
Intervention #3	15
Intervention #4	15
<b>Insights and Key Lessons Learned</b>	<b>16</b>

# Introduction



## Executive Summary

At the start of 2019, the World Health Organization (WHO) listed vaccine hesitancy as one of the top ten threats to global health, and the COVID-19 pandemic has only brought the existing issue to a focal point. In British Columbia (BC), the current COVID-19 vaccination rate for children between the ages of 5 and 11 is 55% (BCCDC, 2022). Pediatric vaccines are fundamental, safe, and cost-effective tools for reducing infectious disease transmission, and low COVID-19 vaccine confidence places community members at risk of serious illnesses, including severe COVID-19 cases, and threatens to reverse scientific progress in public health (Kennedy, 2020).

Complex intersecting factors merge to place individuals at higher rates of reluctance. This project uses a systems-thinking approach to deconstruct parental vaccine hesitancy in BC during the COVID-19 pandemic, including its symptoms, processes, and roots, and proposed interventions.

Please review the Appendix for a glossary of terms in this report.

## Motivation and Positionality

We are a team of four undergraduate students enrolled at the University of British Columbia (UBC). One of our teammates founded the UBC Vaccine Literacy Club (VLC), a student-run organization which aims to increase vaccine awareness through disseminating age-appropriate and culturally-relevant information to the general public, classrooms, and underrepresented individuals. Our team consists of four researchers with no experience in parental decision-making.

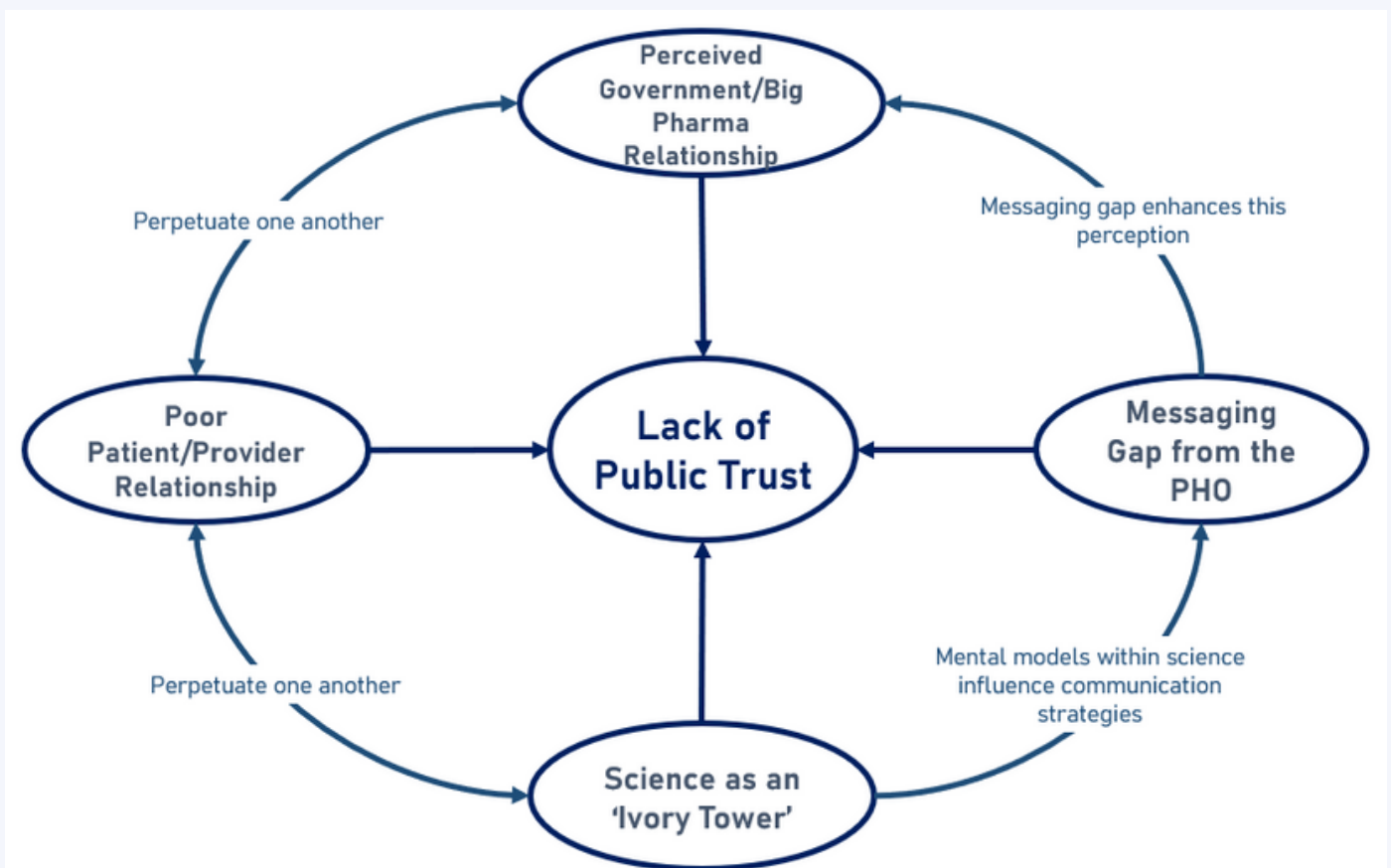
## Research Methods

Beyond an extensive literature review of government publications, academic journals, media articles, and non-fiction writing, our team conducted an anonymous, online survey regarding the public's attitudes towards COVID-19 vaccination and relevant stakeholders, and interviews with physicians and community members. We partnered with the UBC VLC to distribute and conduct our primary research. We took numerous steps to ensure that our primary research was conducted ethically (Appendix 2).

Our sources of primary research include:

- Survey with 123 responses from British Columbians
- 4 interviews with parents from the Metro Vancouver area with vaccine-eligible children
- 22 survey responses from immigrant and refugee women
- Anonymous questions submitted by ~300 attendees at VLC panels open to the public
- Exchanges with researchers, social scientists, and physicians (from Indigenous & non-Indigenous backgrounds)

# Challenge Landscape

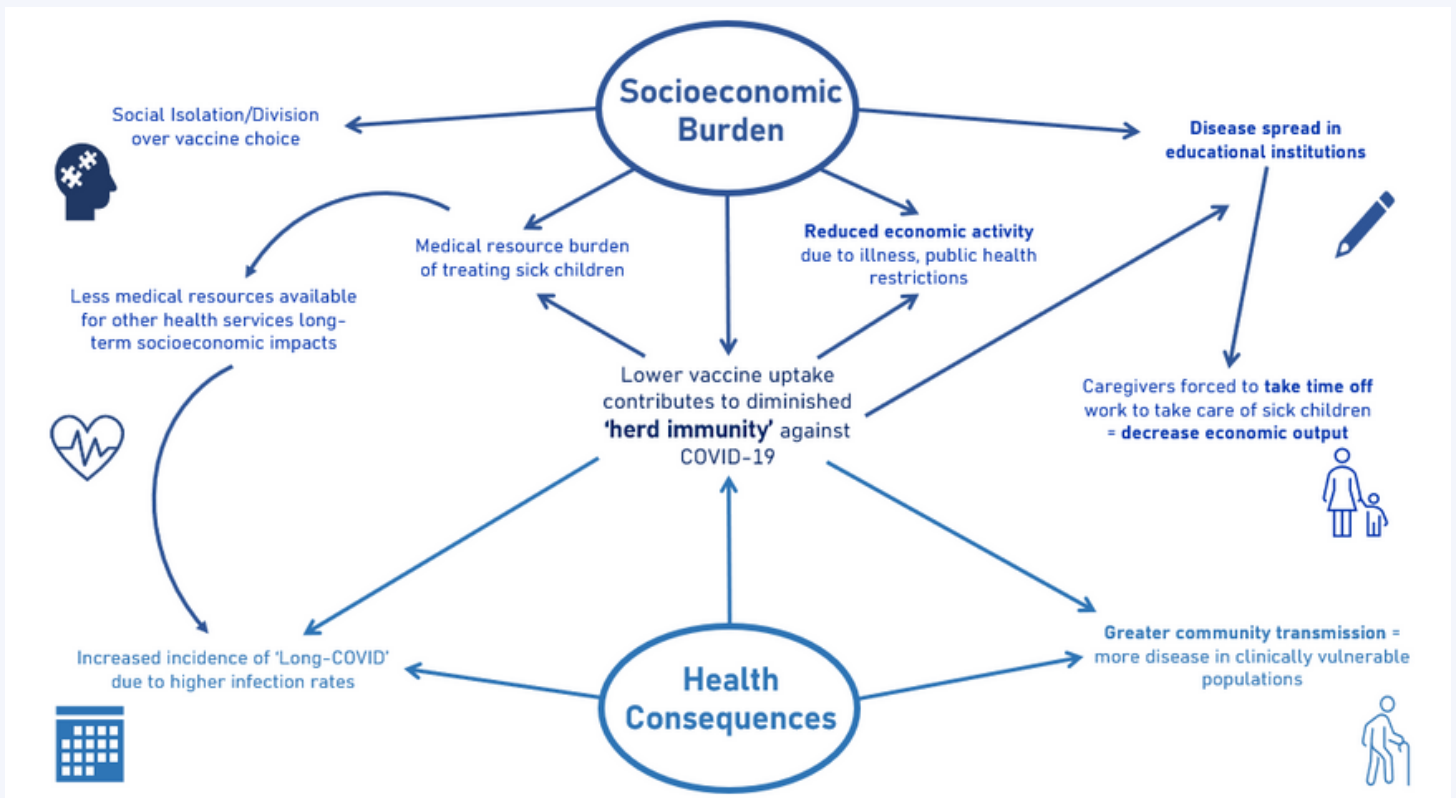




## Defining Vaccine Hesitancy

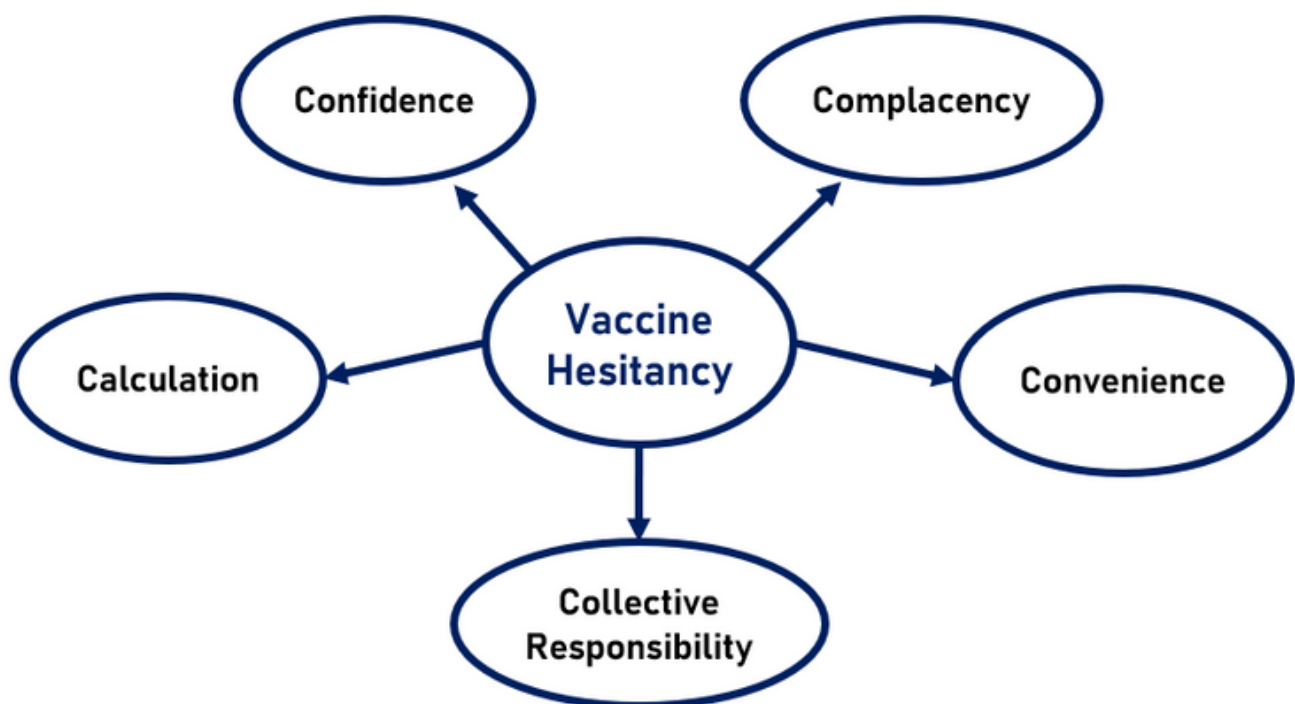
Vaccine hesitancy is defined by the SAGE working group on Vaccine Hesitancy as “delay in acceptance or refusal of vaccination despite availability of vaccination services” (Macdonald, 2015). It embodies a complex and fluid gradient, not a monolithic nor binary term. Individuals range in attitudes towards vaccinations, from being eager-to-accept, to expressing varying degrees of hesitancy, to far extremes of being vaccine-hostile. Multiple geographical, ideological, historical, and sociological factors intersect to determine vaccine confidence (Beleche et al., 2021; Kricorian et al., 2021; Willis et al., 2021). These factors dismount stereotypes of all hesitant individuals relating to “anti-vaxxers”.

Beyond easing the burden of disease, vaccinations are pivotal in reducing transmission and protecting vulnerable populations who rely on herd immunity (i.e., sufficient community immunity to reduce spread). Unvaccinated children can transmit disease to family members and friends, frequently asymptomatic (Zou & Cao, 2021). Higher disease rates in the community represent further social and economic opportunity costs through public health restrictions, shuttered in-person education, and financial and human capital burdens on healthcare. Ultimately, the negative impacts stemming from insufficient herd immunity are felt by marginalized individuals and on a socioeconomic level across BC (Brummernhenrich & Jucks, 2019).



## The 5C's of Vaccine Hesitancy

Factors to hesitancy can be summarized by the 5C's (Betsch et al., 2018; Machingaidze & Wiysonge, 2021). First, '**confidence**' is the level of trust in vaccines' effectiveness and safety, the systems that regulate and deliver them, and the motives of those who establish and implement their policies. Second, '**complacency**' entails the perception that risks of vaccine-preventable diseases are low, rendering vaccines non-urgent and unnecessary. Third, '**convenience**' is the availability and accessibility of vaccines. Fourth, '**calculation**' encompasses individual engagement in extensive information searching, and objective evaluation of risks. Fifth, '**collective responsibility**' covers the extent to which an individual is willing to protect others by personally receiving vaccinations. The 5C's cover the complex assessments each individual makes when deciding to vaccinate themselves or their children.



## Who has the Power to Create Change?

Stakeholders are grouped into six bodies - the media, the federal government, the provincial government, the local community, healthcare and research institutions, and finally, decision-makers (i.e., parents).

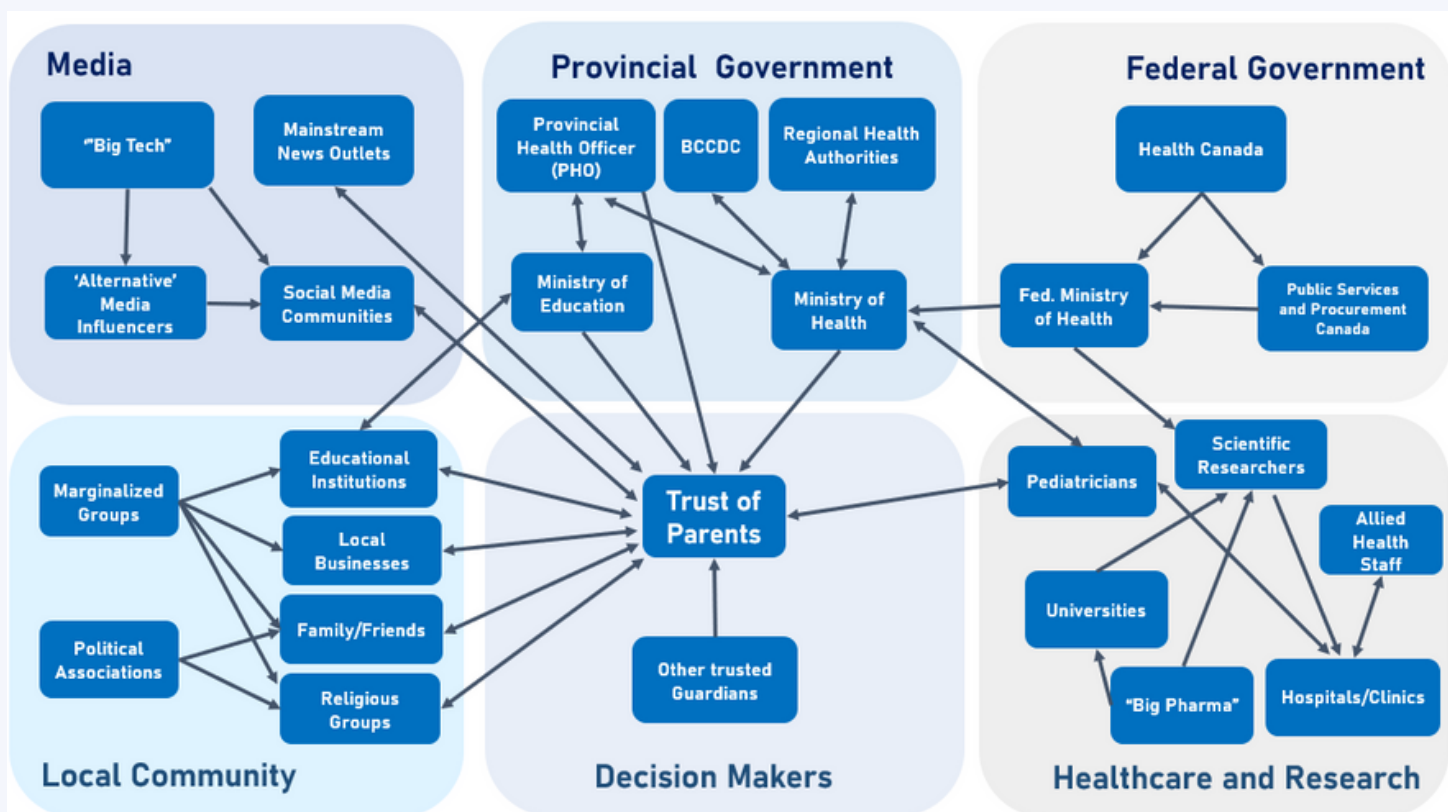
The following actors are macro-level stakeholders which have perpetuated the systemic structures which are in place today:

# 1. Government

As the primary advocate for vaccination, governmental institutions in BC have the greatest power to create change. Their perceived ability to manage the risks regarding the COVID-19 pandemic most directly influences public trust. They possess significant institutional power to create change; for instance, as they procure vaccines, they determine the perceived extent of their relationship with the pharmaceutical industry. Additionally, government establish policy within healthcare and research by controlling funding and regulating stakeholder activity directly.

# 2. Science as an Institution

As an institution, science has adopted a set of mental models which have resulted in alienation and thus mistrust from the public. Scientists have unparalleled expertise in guiding policy-making through their understanding of evidence-based measures and outcomes. However, if the public is unwilling to believe that scientific institutions have positive intentions, scientists yield their role as the 'expert' to other stakeholders, such as actors within the media.





# Root Causes

## Individual factors

The **decision-making process** of a parent to vaccinate their child is dependent on **cultural, social, emotional, cognitive, educational and political components** (Kumar et al., 2016), the aggregate of which contribute to the parents' level of trust in health authorities and their willingness to follow public health recommendations. These factors are often compounding; for example, disadvantaged groups tend to have lower socioeconomic status, which can contribute to more injustices experienced, less formal education attained, and lower health literacy (Biasio, 2017; Svendsen et al., 2020). These factors intersect and culminate in a reluctance to trust vaccinations (Biasio, 2017).

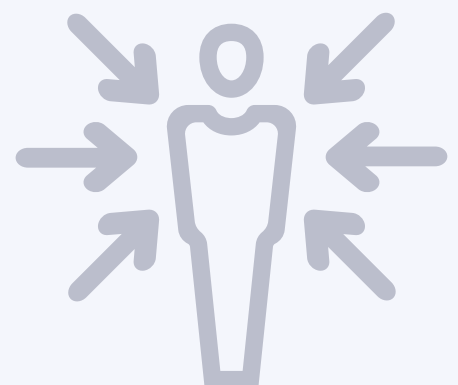
## Extrinsic factors

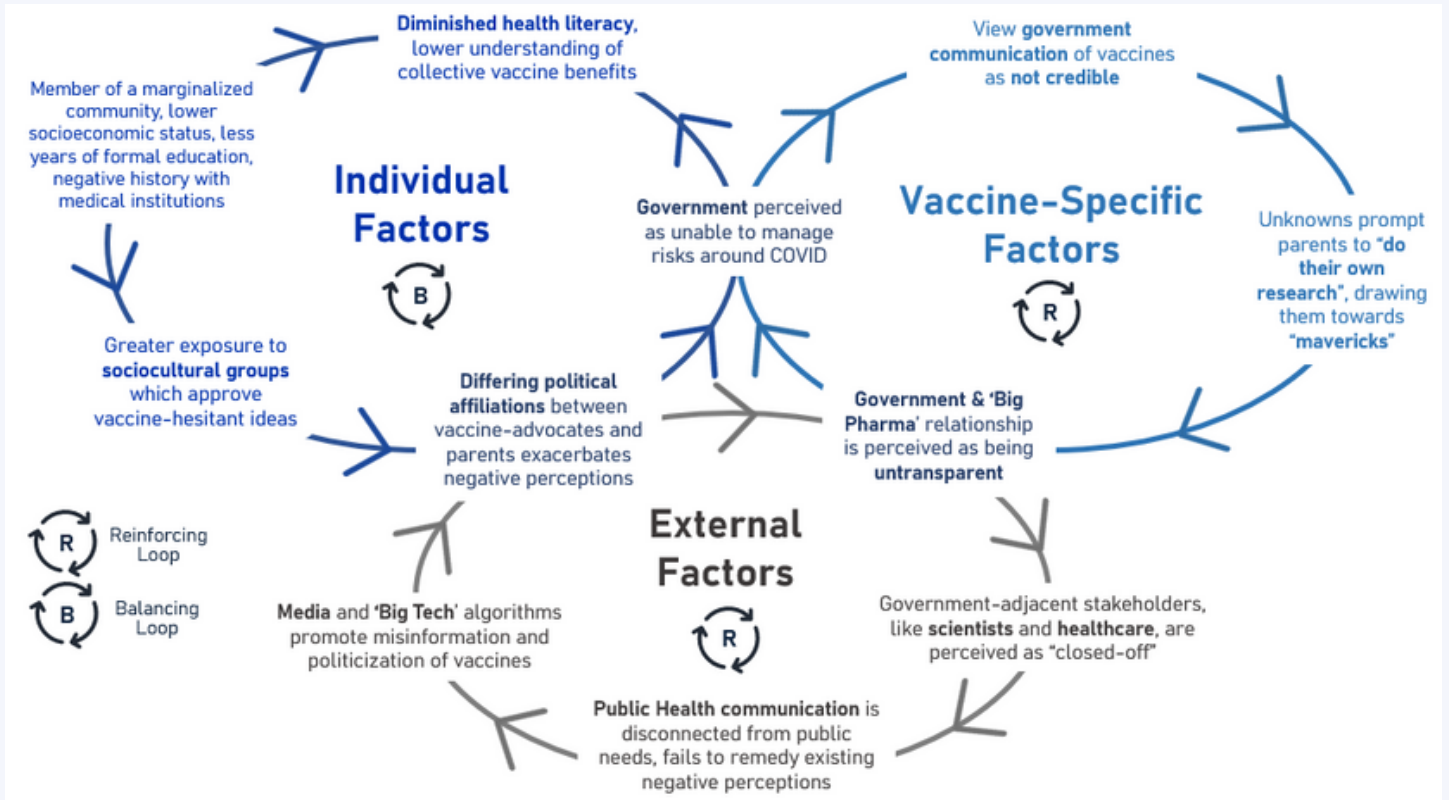
Extrinsic factors include influences from social groups, media, public health messaging and scientific institutions. These influences can reinforce each other, as the types of **social groups** a parent is involved in can contribute to their **perceived social norms and media sources** they are exposed to, which can **amplify and reinforce** existing **mental models**.

## Vaccine/vaccination specific influences

Vaccine-specific factors, such as the efficacy and safety perception of COVID-19 vaccines and COVID-19 disease susceptibility perception, are also key determinants in vaccine hesitancy (Kumar et al., 2016). Doubts over governmental communication regarding vaccines push parents to engage in their own “research”, drawing them to media sources, public figures and social groups which share doubts regarding COVID-19 vaccine efficacy.

*There are complex interactions between individual, external, and vaccine-specific influences. For example, a lack of individual trust in governmental and healthcare institutions can increase the scrutiny of these institutions such that external influences (e.g. misinformation in the media) further validate one's feelings of skepticism and reinforces a further lack of trust in these institutions*





## Role of Trust

For science to play a role in public action, it demands **epistemic trust** from individuals and organizations. For vaccine-hesitant parents, trust in science has been granted *in absentia* upon **scientific experts and governmental institutions** whose impacts **cannot be disentangled from privilege and power**. This sentiment may be aggravated by healthcare provider-patient relationships, community-wide influences and trust in particular institutions, all of which is grounded in history and systemic structures. The **partitioning of governments and scientists** from the public has fermented the individualization of vaccine choice and **left historical agitators of mistrust unchecked**, allowing misinformation and politicization of vaccines to take root. A lack of public trust is at the core of commonly-cited systemic causes of vaccine hesitancy (Goldenberg, 2021).



## GAP 1: MISTRUST BETWEEN PATIENT AND PROVIDER DUE TO MEDICAL RACISM, INABILITY TO ACCESS PROVIDERS & PERSONAL BIASES

Our survey and interviews demonstrated that primary healthcare providers tend to be the most trusted source of COVID-19 vaccination information (Appendix 3). However, parents who are hesitant about vaccination often report their **skepticism arises** from interactions where **practitioners dismiss their vaccine-related concerns** or walk away without providing benefits of vaccination specific to their child (Kirby, 2006; Navin, 2015). Even if a parent wants to discuss pediatric vaccination with a trusted healthcare provider, BC has one of the highest proportions of Canadians (17.7%) without access to a regular healthcare provider, when they need care or advice for their health (Statistics Canada, 2020). This extends beyond just patient-provider relationships, as a long-standing history of **medical racism** against minority groups has **generated a mistrust in medical institutions** altogether (Griffith et al. 2021). In BC, medical legacies of harm caused by healthcare institutions and unethical experimentation have historically targeted Indigenous communities (Calls to Action, n.d.). Such atrocities create substantial barriers to earning the trust of individuals today.

## GAP 2: PUBLIC MESSAGING IN BC RELIES ON THE 'EVIDENCE SPEAKS' MENTALITY, WHICH DOESN'T ACCOUNT FOR COMMUNITY INPUT

BC's public health messaging predominantly focuses on scientific evidence for vaccination and the broad efficacy of vaccines (BCCDC, 2022). Though effective public health messaging should include scientific, evidence-based information, it **cannot be expected that population-wide facts and figures will address parents' specific concerns regarding vaccination for their child** (Goldenberg, 2021). The complex translation of scientific findings into political policy requires **non-scientific consideration of social and historical influences**; hence broadcasting scientific evidence alone only convinces parents to a certain degree. Thus, public health officials must take in community input to effectively reach hesitant parents (Martin & Petrie 2017; Cyril et al. 2015).

"I am vaccinated myself, but I am also skeptical that pharmaceutical companies are completely honest . . . there is a huge financial incentive for companies, like Pfizer (with a lengthy criminal history in safety/misbranding issues), to brush potential risks or side effects under the rug and rush testing."

Survey Respondent

Do you believe vaccine producers are interested in your health?

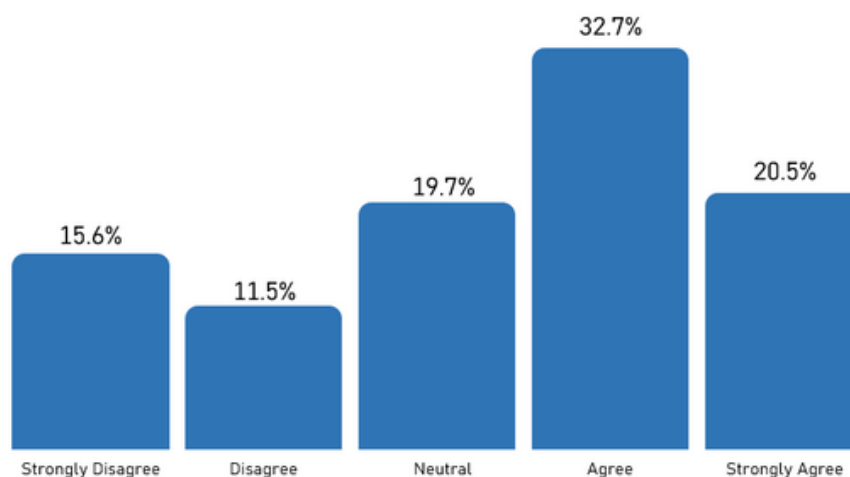


Figure 1. From Appendix 3, Data from Vaccine Attitudes Survey of British Columbians



### **GAP 3: NON-GOVERNMENTAL, PRO-VACCINATION GROUPS ARE FOCUSED ON EDUCATING A 'MISINFORMED, STUBBORN PUBLIC'**

There is frequent criticism of those who are vaccine-hesitant in the media, where skeptical individuals are often aggregated with anti-vaxxers, then blamed as “scapegoats”. Prime Minister Justin Trudeau recently referred to ‘anti-vaxxers’ as “women-haters, racists and science-deniers” (National Post, 2022). Mental models that divide the general public from scientific groups can create an ‘us-versus-them’ mentality. As an example, women’s health issues such as endometriosis or sexual pain are often dismissed as illegitimate and imaginary, and the neither the scientific community nor healthcare providers will always validate the experiences of these women (Norman, 2019). Established frameworks in society and healthcare fail to acknowledge the rightful concerns of hesitant parents, which can ultimately degrade their trust in vaccination recommendations from scientific groups and governmental bodies.

### **GAP 4: MISTRUST IN VACCINES DUE TO TIES BETWEEN MEDICAL RESEARCH, GOVERNMENT, AND PHARMACEUTICAL COMPANIES**

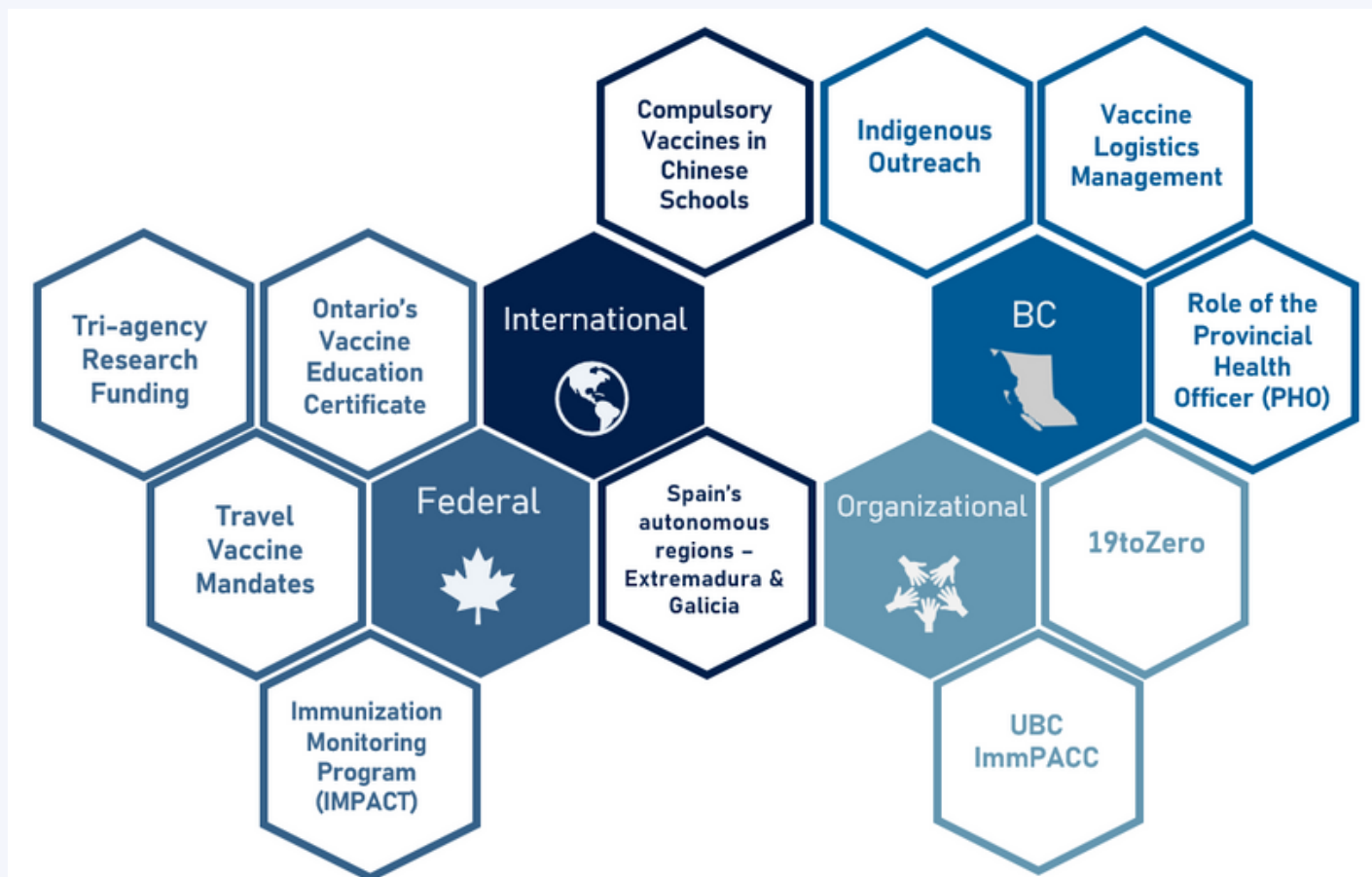
Among various studies looking at factors that underlie vaccine hesitancy, a predominant factor is **suspicion about the political and economic forces driving vaccine development** (Appendix 3; Lavigne 2021; Griffith 2021; Kumar et al. 2016; Martin & Petrie 2021). Over 27% of our survey respondents felt that vaccine producers were not interested in their health, and for the wide majority, their reasons are not founded in conspiracy (Appendix 3). When this suspicion of “Big Pharma” is coupled with shrouded ties to governments, scientists and health practitioners, parents are less likely to trust messaging from these institutions.

### **Science as a Maverick**

While parents and their children will benefit from well-placed trust in scientists, the challenge is knowing when trust is ‘well-placed’ (Goldenberg, 2021). To place their trust in experts, parents need to determine if the expert is appropriately motivated, has the interests of the public at heart, and that their knowledge is credible (Mollering, 2001). When the public does not believe that scientists act with integrity, they shift their trust over to science-adjacent figures, termed Mavericks (Goldenberg, 2021). **Mavericks take advantage of the gaps left by scientists** to advance their agenda, which in the case of vaccines, is often an agenda that disincentivizes vaccine uptake.

# Solutions Landscape

The spectrum of successful solutions is incredibly diverse, with both community-guided initiatives and draconian, top-down policies having some measure of success. However, when speaking of increasing vaccine uptake in pediatric populations in BC, solutions that focus on building trust, opening public dialogue, and improving access have the greatest potential to address gaps in the system (Appendix 3).



## International Solutions:

### 1. Extremadura & Galicia:

In BC, pediatric vaccine uptake is lowest in the Northern Health region relative to other health authorities (BCCDC, 2022). Remote areas show trends of lower vaccine uptake, and the Northern Health Region is largely rural (BCCDC, 2022). In Spain, two rural 'autonomous regions,' Extremadura and Galicia, present distinct strategies. Extremadura hosts vaccine clinics and pediatricians' hours in schools, and Galicia threatens to fine vaccine holdouts (El Pais, 2021; The Local, 2021).

### 2. China:

In China, some regions have made COVID-19 vaccines mandatory for family units of children that attend school (BBC, 2021). In conjunction with intense societal pressure, these measures resulted in over half of Chinese children aged 3-11 receiving a COVID vaccine by late October 2021 (New York Times, 2021).

## Federal Solutions:

### 1. Ontario's Vaccine Education Certificate:

In 2017, Ontario introduced a mandatory vaccine education clinic for parents who sought an exemption for their children. It had a "0% conversion rate" as of 2019 (Goldenberg, 2021). Parents did not appreciate feeling as if they were being talked down to, nor the fact that they were forcibly 're-educated.'

### 2. Immunization Monitoring Program (IMPACT):

IMPACT is a national active surveillance network for adverse vaccine events (IMPACT, 2021). Beyond the program's intrinsic value, it also demonstrates to parents that practitioners and policy makers care about adverse vaccine effects.

## Provincial Solutions:

### 1. Role of the PHO

BC has received academic and media acclaim for Dr. Bonnie Henry's role as a calm, consistent, expert face in COVID-19 communication (New York Times, 2020). BC's population views Dr. Henry as capable of managing the risks around COVID and, therefore, are more likely to have confidence in her vaccine recommendations (Goldenberg, 2021). However, much of this public confidence eroded throughout the Omicron wave of the pandemic, with her public approval falling to its lowest point in January 2022 (Vancouver Sun, 2022).

### 2. Vaccine Logistics

BC allows children to receive their vaccination during their parent's appointment, increasing convenience. While this is a positive incentive, roughly 1 in 5 responders still reported logistical difficulties as a barrier to receiving their vaccine (Appendix 3).

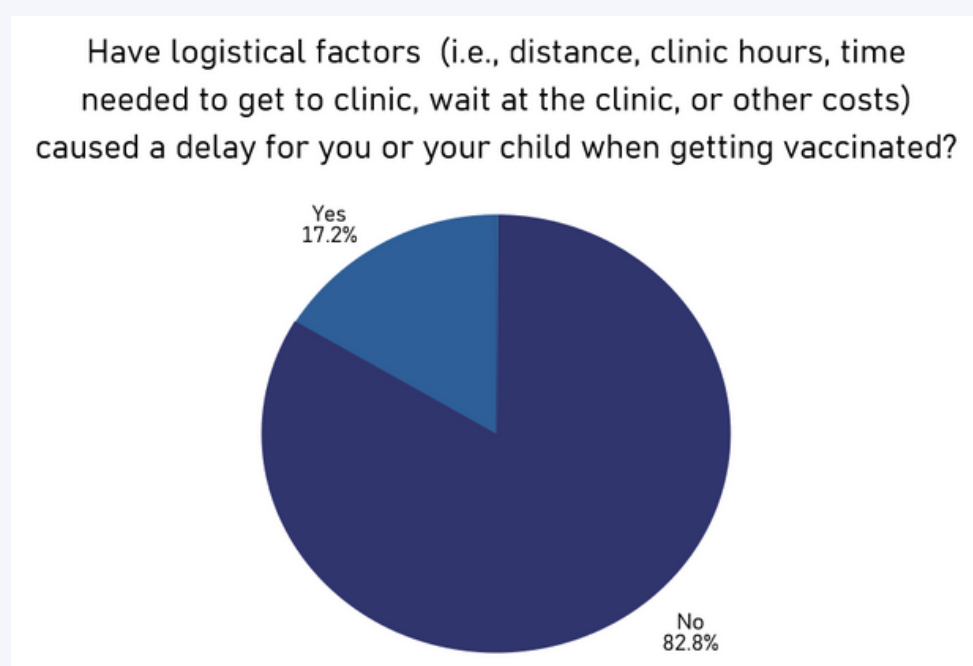


Figure 2. From Appendix 3, Data from Vaccine Attitudes Survey of British Columbians



## Community Solutions:

### 1. UBC ImmPACC:

UBC ImmPACC is a pilot workshop operated by the UBC Faculty of Medicine. Local stakeholders (e.g., municipal bodies, health clinics) can invite the UBC ImPACC team to discuss community-specific immunization barriers and collaboratively design customized solutions to address these barriers (Immunization Primary and Community Care Mapping, 2021).

### 2. 19toZero:

19toZero is a non-profit organization of economists, public health scientists, and academics whose goal is to produce public messaging that increases vaccine confidence (19toZero, 2022). While the success of 19toZero's interventions has not been measured, they received praise for incorporating behavioral science practices into public messaging (Shapiro et al., 2022). However, their communications don't target the most cited concerns of vaccine-hesitant parents (Appendix 3).

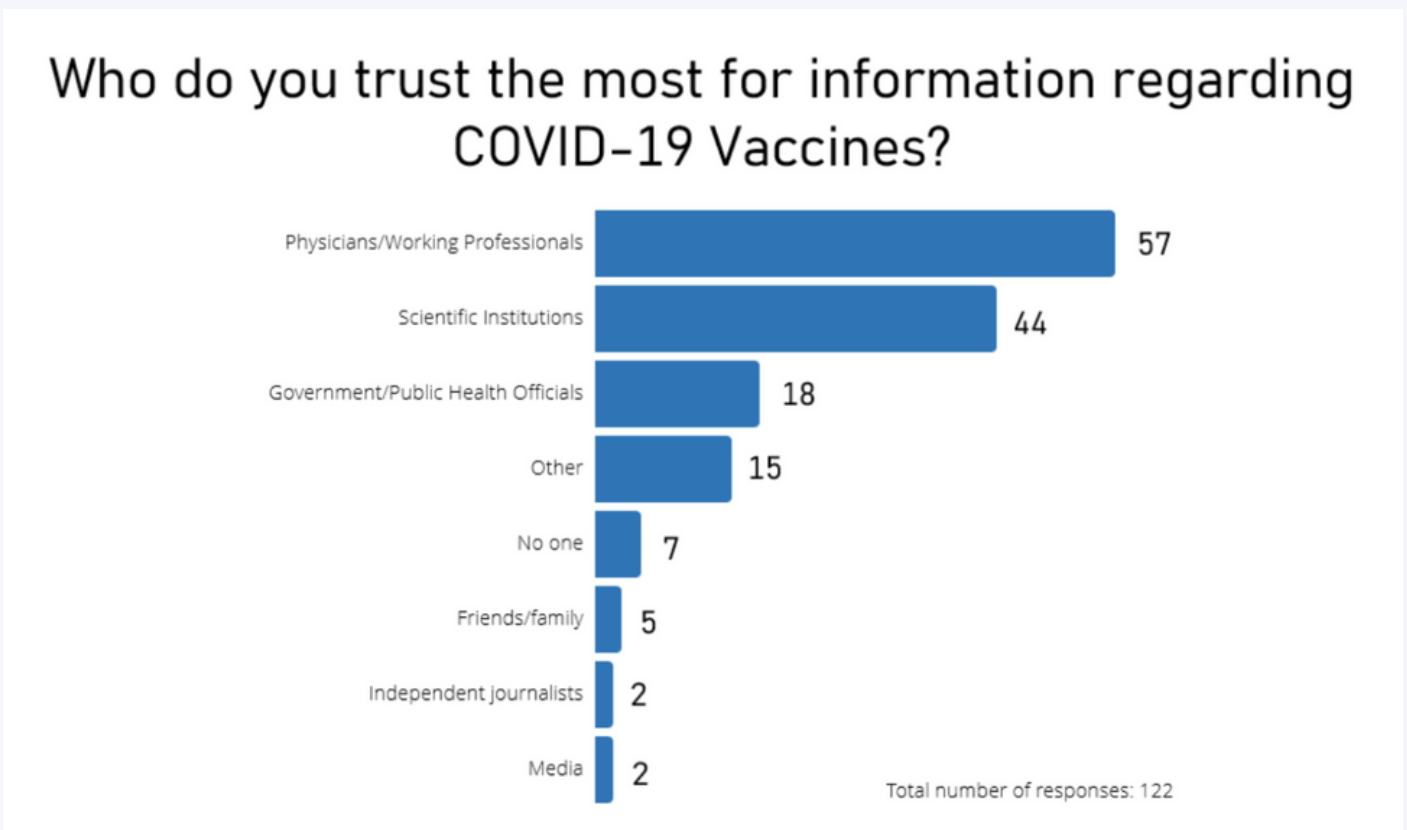
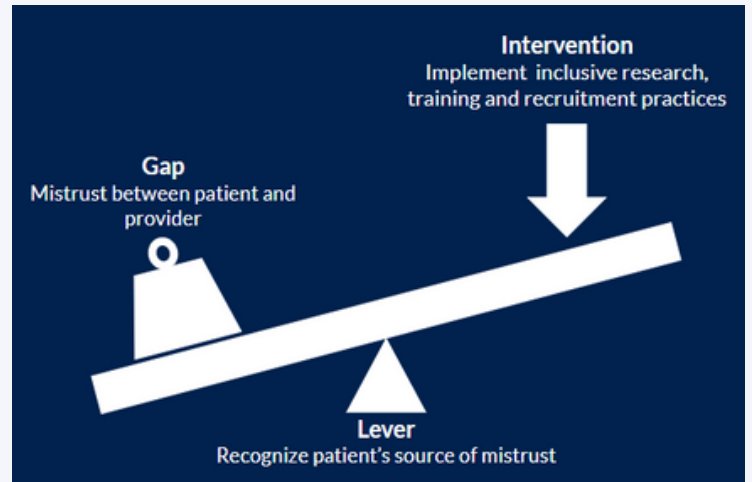


Figure 3. From Appendix 3, Data from Vaccine Attitudes Survey of British Columbians

# Stakeholder Action

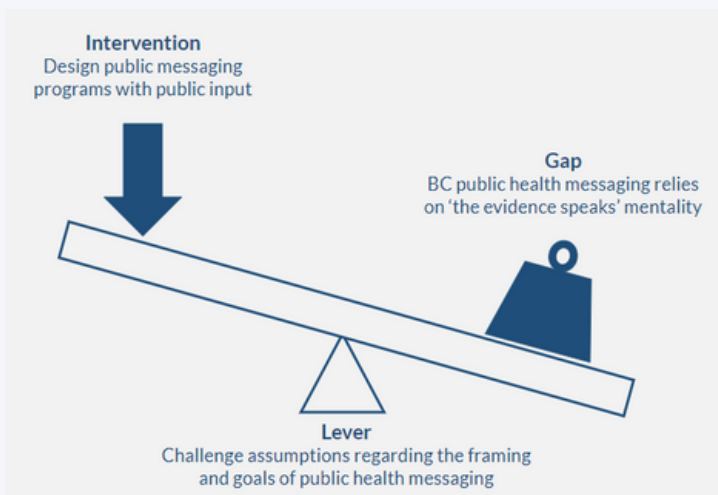
## Intervention 1

To build trust in marginalized communities, all levels of government have an obligation to **acknowledge problematic historical narratives** and implement policies to **decolonize existing institutional structures**. The provincial healthcare system must **increase the number of Indigenous and underrepresented professionals working in healthcare**, reflecting the diverse demographics served (Goldenberg, 2021). Cultural competency training should be required for all healthcare professionals, and BC's post-secondary institutions (i.e., medical and nursing schools) should mandate skills-based training coursework on intercultural competency, conflict resolution, and anti-racism (Deer, 2020; RCCbc, 2021). When conducting research and discussing policy, **Indigenous and minority community members must be directly included as stakeholders**. In individual relationships, healthcare providers should empathize with and address concerns, validate emotions, and seek solutions through a patient-oriented lens (Goldenberg, 2021).



## Intervention 2

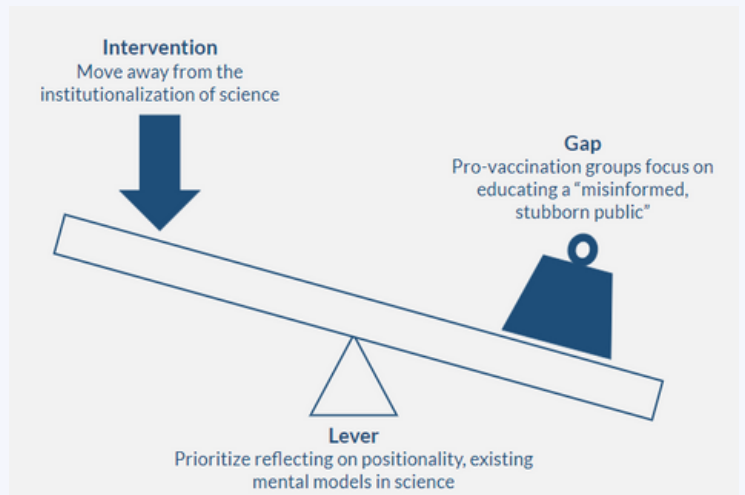
Upstream interventions rely on improving public health messaging; transitioning from **dumping large quantities of scientific facts** for the decision-maker to navigate and expecting them to automatically arrive at the most logical decision, **to explaining evidence in relevant social contexts as a form of guidance**. From our primary data, one-panel attendee noted that derogatory terms "anti-vaxxer" and "pandemic of the unvaccinated" may be contributing to further vaccine hesitancy, highlighting the need for a solution focused on solidarity rather than division (Appendix 3). Our primary data also indicated that **British Columbians would like to see more data released regarding COVID** and have direct opportunities to ask the PHO questions about COVID and vaccines (Appendix 3). Downstream interventions, though not fully effective on their own, can help curb misinformation and disinformation by recognizing the ongoing infodemic in BC and teaching fact-checking to students via the education curriculum (CBC News, 2022).



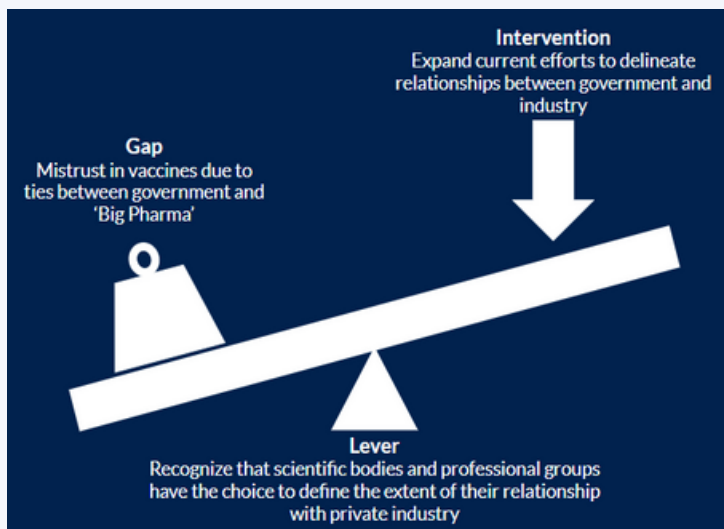
"There are hundreds of questions about the [vaccine] that people want answers to, yet the message is always the same, 'trust the science' or 'this is for people's health'. " - Survey responder

### Intervention 3

Given that scientific research is driven by humans with unique positionalities, affiliations, and conflicts of interest, **scientific institutions must reflect on status quo mental models to regain public trust.** Many of our survey respondents indicated they felt that science was alienated from their inquiries (Appendix 3). To combat this, stakeholders (e.g., Tri-Council) should encourage solutions which emphasize public engagement, such as the **adoption of Open Science** through collaboration with the public.



“I would have been more comfortable with getting vaccinated if the government (and various pro-vaccine information sources) had simply been honest about what we know and don't know, and helped people understand the concept of risk properly.” - Survey Responder



### Intervention 4

The **association between institutional vaccine advocates and profit-generating vaccine producers ferments public mistrust in the COVID-19 vaccine itself** (Appendix 3). To address this, provincial and federal governments need to take transparent, proactive steps. For instance, the provincial government has an obligation to explain the rationale for current COVID-19 pediatric vaccination protocols as a prerequisite to obtaining public trust. The provincial government needs to strictly demarcate funding for academia and industry, impose transparent communication requirements for combined funding models, and increase regulatory oversight for relationships between pharmaceutical companies and practitioners. The federal government and funding bodies (i.e., Tri-Council Agencies) should adopt the international standards for **lobbying regulations**, detailing lobbying meetings' contents and **purposefully disseminating these summaries** (International Standards for Lobbying Regulation, 2015).



# Key Insights and Lessons Learned

This report sought to shed light on the dynamic interactions between factors that challenge long-term vaccination acceptance. We acknowledge that our primary data collection methods are limited, both in their questions and distribution. While our methods should not be misinterpreted as scientific polling, they did still provide some direct insight into factors underlying vaccine hesitancy. Furthermore, we acknowledge that our suite of interventions will not impact all parents equally. There will inevitably be some parents who will resist vaccination even after all feasible interventions have been applied.

Given the complexity of this issue, we now understand that simply the act of classifying individuals as “pro-” or “anti-vaxxers” can exacerbate an ‘us-versus-them’ mentality, thus recognizing vaccine hesitancy as a fluid spectrum can promote conversations between individuals with differing positions and foster a foundation for building trusting relationships. The decision to vaccinate one’s child is complex; thus, as science students, we need to recognize the mental models that impact our perception of the system. While scientific study may be the basis through which healthcare decisions are made, we must understand how to translate scientific findings and language into healthcare policy such that it appeals to the values and personal priorities of public stakeholders.

We hope this report has highlighted how critical trust is to policy-making. The deficit of public trust in pediatric vaccination is only part of the greater problem of mistrust in healthcare and contested science in general. Those working in public health and scientific institutions cannot take epistemic trust for granted. Given that trust is integral to the community goals of health authorities, it's necessary for relevant stakeholders to shift their focus towards the overarching goal of how to earn and maintain public trust.

