

FACTORS IMPACTING VACCINE HESITANT PARENTS

Factors Impacting Vaccine Hesitant Parents of Young Children in Northern British Columbia: A  
Qualitative Study from a Health Care Communicator's Lens

by

Haylee Seiter

A Thesis Submitted to the Faculty of Social and Applied Sciences in Partial Fulfilment of the  
Requirements for the Degree of

Master of Arts in Professional Communication

Royal Roads University

Victoria, British Columbia, Canada

Supervisor: Dr. Zhenyi Li

August, 2023

© Haylee Seiter, 2023

COMMITTEE APPROVAL

The members of Haylee Seiter's Thesis Committee certify that they have read the thesis titled Factors Impacting Vaccine Hesitant Parents of Young Children in Northern British Columbia: A Qualitative Study from a Health Care Communicator's Lens and recommend that it be accepted as fulfilling the thesis requirements for the Degree of Master of Arts in Professional

Communication:

Dr. Zhenyi Li [signature on file]

Dr. Chris McIntosh [signature on file]

Dr. Jong Kim [signature on file]

Final approval and acceptance of this thesis is contingent upon submission of the final copy of the thesis to Royal Roads University. The thesis supervisor confirms to have read this thesis and recommends that it be accepted as fulfilling the thesis requirements:

Dr. Zhenyi Li [signature on file]

### **Abstract**

In 2019 the World Health Organization (WHO) declared vaccine hesitancy as a top threat to global health while highlighting the concerning resurgence of vaccine preventable diseases. In the Northern British Columbia region, which is under the jurisdiction of the Northern Health Authority, there are lower routine child vaccination rates than the rest of the province, however, these rates do not tell us *why* parents may be vaccine hesitant. As a communications professional working in healthcare, I conducted this qualitative research to better understand the local barriers and drivers of vaccination for Northern BC parents. Semi-structured interviews were conducted with two key audiences: parents of young children (five years and younger) and immunizers (nurses) who administer routine child vaccinations. The interview data were analyzed using discourse analysis to develop vaccination-related themes. Unexpected results included the negative impact of the COVID-19 pandemic on increasing parental vaccine hesitancy, the impact of the pandemic on increasing general vaccine awareness, the experience of first-time parents, and the impact of family dynamics in small communities. This research also revealed the extreme difficulty in recruiting participants in the vaccine-hesitant parent population. In accordance with the WHO's Tailoring Immunization Programmes approach of not guessing why populations may be hesitant but determining the root cause, this research sheds light on several reasons why Northern BC parents may be vaccine-hesitant, and it goes one step further by offering strategic communication recommendations informed by the Behaviour Change Wheel to help increase vaccine uptake for young children in the region.

*Keywords:* childhood vaccinations, vaccine hesitancy, strategic communications, parents, immunizers, Northern BC, Behaviour Change Wheel, Tailoring Immunizations Programmes approach

**Acknowledgement**

Thank you to my Northern Health leadership team for supporting the idea of this research and helping me to pursue it while balancing a full-time career. Thank you to my dedicated supervisor and committee for their expertise and commitment to reading my numerous drafts. Thank you to the study participants for their valuable contributions and time – without your participation, this research would not have been possible. Thank you to my love for encouraging me to continue when I thought I could not.

**Table of Contents**

Introduction.....	7
Literature Review.....	9
Theoretical Frame and Paradigm.....	10
Established Causes of Vaccine Hesitancy.....	14
Emerging Causes of Vaccine Hesitancy .....	16
Strategies to Combat Vaccine Hesitancy .....	18
Research Design.....	20
Methods.....	21
Data Collection.....	21
Participant Justification .....	23
Recruitment Techniques and Interview Procedures.....	25
Data Analysis.....	28
Results.....	29
Parent Sample Characteristics.....	29
Immunizer Sample Characteristics.....	30
Unexpected Interview Question Responses and Themes .....	31
Expected Interview Question Responses and Themes.....	36
Responses and Themes on How to Better Communicate About Vaccines to Parents.....	42
The Impact of the COVID-19 Pandemic.....	52
Discussion.....	56
Local Vaccine Hesitancy Factors That Influence Northern BC Parents.....	56
Parent Participant Recruitment Challenges.....	60
Evidence-Based Communication Strategies.....	62
Conclusion.....	69
References .....	71
Appendix A: Sample Social Media Communication to Recruit Parent Participants.....	79
Appendix B: Interview Questions.....	80

As a communications practitioner and researcher, I bring a unique lens to the well-established topic of vaccine hesitancy. In conducting this thesis, my hope is to provide insight on local vaccine hesitant parents in my home region of Northern British Columbia, as well as to give evidence-based and research-informed communication recommendations to increase vaccine uptake for young children in the region.

The Northern region of the Canadian province of British Columbia is an area larger than California and extends north to the Yukon border, west to the Alaska border, and east to the Alberta border (Destination BC, n.d.). The area contains approximately 300,000 people and is home to a wide array of spectacular natural beauty. The Northern Health Authority, commonly known as Northern Health, is a publicly funded health care providing organization for the area. Northern Health is one of five regional health authorities in the province of BC and covers Northern BC as far south as Quesnel, as far west as the island of Haida Gwaii, as far north as Atlin near the Yukon border, and as far east as Valemount near the Alberta border. Prince George, which is based on the traditional and unceded territory of the Lheidli T'enneh First Nation, is considered the health care hub of the region. Both the Provincial Health Services Authority and the First Nations Health Authority provide services to the entire province of BC and have some service overlap within the Northern Health region. The Provincial Health Services Authority provides specialized services and programs such as cancer care, and the First Nations Health Authority specializes in health care for Indigenous people. In total, Northern Health delivers health care to 32 communities and 55 First Nation communities in the Northern BC region (Northern Health Authority, n.d.).

At Northern Health, I worked as a communications advisor for the Public Health department for six years, where part of my role was to promote vaccinations, which included creating messages to advise parents of childhood vaccinations. After experiencing the COVID-19 pandemic first-hand as a health communicator and witnessing society and parents in particular grapple with a novel coronavirus and subsequent new vaccine, the idea for this research was born. The goal was practical: to better understand my target audience of parents and guardians of young children, in the context of my organization's childhood vaccination objectives. Specially, to understand the local barriers and drivers of vaccination, including parents' capabilities, motivations, and opportunities that impact their vaccination behaviours for their children. Vaccine hesitancy is complex, however, I believe communication-based initiatives could be part of the solution.

Prior to the COVID-19 pandemic, increasing child immunization coverage was part of the Northern Health 2020/21 – 2022/23 service plan (Northern Health Authority, 2020). Post-pandemic it continues to be a priority, as there are lower routine child vaccination rates for young children in the Northern BC region than the rest of the province (BC Centre for Disease Control, 2021a). During the pandemic, I supported COVID-19 vaccination communication efforts which gave me a front-row seat to the vaccine hesitancies and concerns of Northern British Columbians. It showed me that now, more than ever, it is essentially important as health care providers to cut through the noise of vaccine misinformation to maintain and increase herd immunity. The World Health Organization (WHO) supports my claim that vaccine hesitancy is a problem that health care providers need to pay attention to. In 2019, they declared that vaccine hesitancy was a threat to global health (World Health Organization, 2019a). According to the



most recent 2019 Canadian National Immunization Coverage Survey (cNICS), the majority of parents or guardians of two-year-olds agreed that vaccines were safe and effective and helped protect their child's health (Statistics Canada, 2021). Prior to the COVID-19 pandemic, vaccine coverage among 2-year-olds was stable in 2019 compared to coverage in the 2017 survey, however Canada and the Northern BC region is still short of the 95% vaccination rate needed to reach herd immunity which is why my research is both relevant and timely (Public Health Agency of Canada, 2022a; BC Centre for Disease Control, 2021a).

My research centers on two questions: why and to what extent are parents of young children (0-5 years) in Northern BC vaccine hesitant, and what evidence-based communication strategies should be used to increase child immunization rates in the region? To answer these questions, I interviewed two demographics within the Northern Health region: parents of young children (0-5 years) from each of the health service delivery areas (HSDAs) of the region (Northern Interior, Northwest, and Northeast), and health care providers (immunizers) that provide child immunizations. To summarize, I set out to as a graduate student researcher and communications employee to help NH improve the health of the Northern BC population by one: providing a better understanding of what vaccine hesitancy factors influence local parents' decision to vaccinate their children or not; and two: advising what evidence-based communication strategies should be used in NH child immunization work.

### **Literature Review**

According to the World Health Organization's SAGE working group on vaccine hesitancy, vaccine hesitancy can be defined as "a delay in acceptance or refusal of vaccination despite availability of vaccination services. It is complex and context specific, varying across

time, place, and vaccines, and is influenced by factors such as complacency, convenience and confidence” (MacDonald, 2015, p. 4163). Vaccine hesitancy can be thought of as the middle ground in a continuum of behaviours that individuals may take for vaccination. On one end of the continuum the individual accepts all vaccines, and on the opposite end of the continuum the individual rejects all vaccines. In the middle of the continuum an individual may accept, delay, or refuse some vaccines, or accept all vaccines and refuse all vaccines but feel unsure about it (MacDonald, 2015, p. 4162). Vaccine hesitant individuals are not a homogenous group and there is not a standardized measurement of vaccine hesitancy, which makes classifying and measuring vaccine hesitancy difficult (Dubé et al., 2016a). Vaccine hesitancy is significant because it lowers vaccine demand which is eroding decades of vaccination protection and has led to outbreaks of vaccine preventable diseases both worldwide and within Canada (Sondagar et al., 2020).

### **Theoretical Frame and Paradigm**

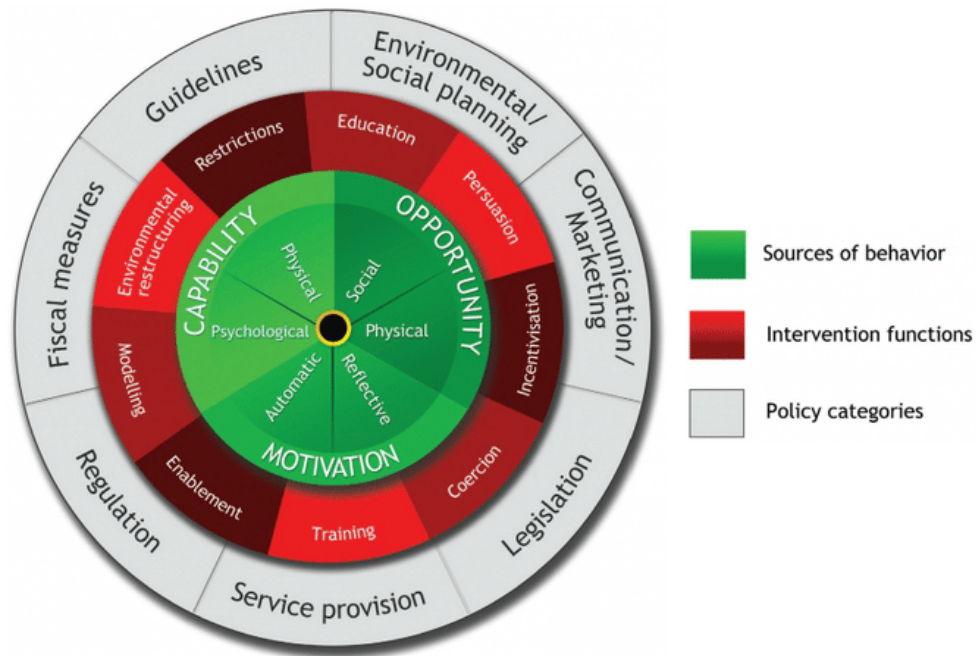
I chose to use a qualitative interviewing approach for my research, which is rooted in the epistemological paradigm of interpretation, to gain rich descriptions not typically accessible through other research methods such as surveys. In the interpretive paradigm, a person’s perceptions and values impact what is seen and understood about the world, therefore there can be multiple, equally legitimate interpretations (Merrigan, 2012, p. 37). In this paradigm, rich descriptions form the foundation of interpretive research data. Rich data can be defined as the use of a broad range of data sources to show how communication occurs and what it means to participants in that context (Merrigan, 2012, p. 37). Unlike discovery-based research, categorization is not the point of interpretive-based research, and while meanings can be

categorized, interpretive researchers use rich description to understand the whole context in which meanings are constructed and then interpret the patterns that emerge from the descriptions (Merrigan, 2012, p. 37-38). The interpretive paradigm leans into subjectivity and researchers using this paradigm must acknowledge that they themselves are active participants in the research process (Merrigan, 2012, p. 38). This was the other reason I chose to use the interpretive paradigm – as both a health care professional and communications student researcher, I wanted to lean into my dual roles and share my experience in my research process.

In vaccine hesitancy literature, behaviour change theories are most often used, such as the Health Belief Model (HBM), the 5C Psychological Antecedents of Vaccine Hesitancy, and the Behaviour Change Wheel (BCW). While the HBM and 5C models are widely used due to their ability to predict health behaviours like vaccination, I chose to frame my research in the BCW which uses a synthesis of 19 frameworks of behaviour change including a behaviour model called COM-B (Michie et al., 2014, p. 11).

### ***The Behaviour Change Wheel (BCW)***

The BCW, as shown in Figure 1, was introduced in 2011 and was developed to help intervention design move from behavioural analysis of a problem to an evidence-based intervention method (Michie et al., 2014). Since the World Health Organization's Tailoring Immunization Programmes approach draws on the BCW and one of my research goals was to uncover evidence-based communication strategies to use in Northern Health child immunization work, using the BCW to frame my research felt both appropriate and promising (World Health Organization, 2019b).

**Figure 1***The Behaviour Change Wheel*

*Note.* From *The Behaviour Change Wheel: A Guide to Designing Interventions* (p. 18), by Michie S, Atkins L, West R., 2014, London: Silverback Publishing ([www.behaviourchangewheel.com](http://www.behaviourchangewheel.com)). Copyright 2014 by Susan Michie, Lou Atkins, and Robert West. Reprinted with permission.

As a model, the BCW consists of three layers: the hub of the wheel which is made of the COM-B model (C-capability, O-opportunity, M-motivation, and B-behaviour), the middle layer which is made of nine behaviour change intervention functions, and the outer layer which is

made of seven policy categories that can support the delivery of the behaviour change intervention functions (Michie et al., 2014).

The inner COM-B model layer identifies sources of behaviour that can be targeted by behaviour change interventions and includes six sub-components: physical capability, psychological capability, physical opportunity, social opportunity, reflective motivation, and automatic motivation (Michie et al., 2014). Surrounding the hub is a layer of nine intervention functions to choose from based on the particular COM-B analysis one has undertaken – these include restrictions, education, persuasion, incentivization, coercion, training, enablement, modeling, and environmental restructuring (Michie et al., 2014). The outer layer, the rim of the wheel, identifies seven policy categories that can support the delivery of these intervention functions and includes: guidelines, environmental/social planning, legislation, fiscal measures, regulation, service provision, and communication/marketing which I am most interested in (Michie et al., 2014).

As an intervention design guide, the BCW follows an eight-step process including:

1. Defining the problem in behavioural terms.
2. Selecting the target behaviour.
3. Specifying the target behaviour.
4. Identifying what needs to change.
5. Identifying intervention functions.
6. Identifying policy categories.
7. Identifying behaviour change techniques.
8. Identifying mode of delivery.

For each intervention function, an evidence-based behaviour change technique is available (Mitchie et al., 2014. 150). For example, for the intervention function of education, the most frequently used behaviour change techniques are information about social and environmental consequences, information about health consequences, feedback on behaviour, feedback on outcomes of the behaviour, prompts/cues, and self-monitoring of behaviour (Mitchie et al., 2014. 151). For modes of delivery, the BCW offers a dichotomy of distance modes or face-to-face modes and distinguishes between an individual level or population level (Mitchie et al., 2014. 177).

### **Established Causes of Vaccine Hesitancy**

In the literature, there is consensus that vaccine hesitancy has no single cause. There are many factors at play, which makes it a complex phenomenon. The World Health Organization's Strategic Advisory Group of Experts on Immunization uses a simple model and a complex model to explain the causes of vaccine hesitancy. In the simple model, there are three key factors that cause vaccine hesitancy: complacency, convenience, and confidence (the 3Cs). In the complex model, there is a matrix that captures contextual influences (media, politics, culture, religion), individual and group influences (personal experience, beliefs, attitudes), and vaccine-specific issues (vaccine risk/benefit, knowledge and attitude of health care providers) (World Health Organization, 2014).

### ***Health Literacy***

When examining routine child vaccination hesitancy, it is helpful to understand *who* is experiencing the hesitancy, which in this case is parents. As caregivers, parents are the vaccine decision makers for their children. Decisions and actions to vaccinate, or not, are influenced by

parental attitudes, beliefs, and knowledge (Krishna, 2018). The problem is that many parents struggle with health literacy – they make vaccination decisions based on inaccurate information, and struggle to find and understand credible sources of information (McGregor & Goldman, 2021). Health literacy can be defined as “the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions” (Life Literacy Canada, 2022, What is Health Literacy section, para. 1). Krishna (2018) found that vaccine knowledge deficiency (the acceptance, storage, and use of inaccurate information) contributed to vaccine negativity which consequently impacted communication behaviours and intentions to vaccinate. Although I am not a parent myself, I sympathize with those who are in our information age, as the *infodemic* that took place alongside the COVID-19 pandemic made it difficult to access credible vaccination information. An infodemic is defined as “an overabundance of information – some accurate and some not – that makes it hard for people to find trustworthy sources and reliable guidance when they need it” (Pan American Health Organization, 2020).

### ***The Decline of Public Trust***

One of the major influences on vaccine hesitancy is the decline in public trust. This phenomenon is being seen globally according to Flew (2021), who highlights the steady decline of trust in institutions, government, and journalism since the 1970s. Flew (2021) acknowledges the complex relationship between social media and other digital platforms and trust. Besides the global trend of trust declining, the literature repeatedly highlighted the fact that doctors hold a high level of trust with their patients when it comes to vaccine opinions and information (Dubé et al., 2016a). As Schellenberg & Crizzle (2020) stated in their review, trust and access to health

care providers is significantly associated with vaccine uptake, more so than parents' vaccine knowledge.

### **Emerging Causes of Vaccine Hesitancy**

In this section we will review emerging themes on the causes of vaccine hesitancy not covered in the previous section of found causes. These themes are current issues facing society following the COVID-19 pandemic and include the impact of digital media and misinformation, the parallel rise of anti-vaccine and conspiracy rhetoric, and the impact of the COVID-19 pandemic itself.

#### ***The Rise of Digital Media and Misinformation***

When looking at vaccine hesitancy, we must understand the channels where vaccine hesitancy is taking place. The rise of digital media platforms has had a profound impact on how we access health information and participate as a society in general. Fryer (2016) notes this in her Royal Roads master's thesis, which focused on the influence of information found on the internet on parents' vaccine decisions for their children. It was found that parents seek information to support preconceived biases toward vaccinations, as well as reduce anxiety and uncertainty on decision making (Fryer, 2016). Other scholars have linked the increased use of digital platforms over the past 10 years with the decrease in vaccination, in part due to the barrage of misinformation that spreads more rapidly and deeply than the truth (Featherstone, 2020; Vosoughi et al., 2018).

#### ***The Increase of Anti-Vaccine and Conspiracy Theory Rhetoric***

Ever since the first mass immunization campaign was launched in the 19<sup>th</sup> century, anti-vaccine movements and anti-vaccine rhetoric, have existed (Dubé, 2014). The modern-day



movement (from the 2000s and onwards) was fueled by the Wakefield scandal, despite the discredited 1998 research paper being thoroughly retracted in 2010. The discredited paper caused global widespread mistrust of the MMR vaccine, and concerning, misinformation from this discredited paper continues to spread, which has been made possible by the ease that social media platforms allow users to spread their message widely and recruit new members (Royal Society for Public Health, 2019). As society has increased its use of digital media, so too has the anti-vaccine movement, which uses social media platforms to plant doubt in vaccines despite decades of evidence concerning vaccine safety and effectiveness (May 2020; Dubé et al., 2014). For example, Canadian anti-vaxxer and conspiracy theorist Chris Sky used his accounts on Twitter and Instagram to spread misinformation about vaccines and organize disruptive anti-vaccine mandate events during the COVID-19 pandemic before being banned from both platforms in 2021 for his activities (blogTO, 2021). In the United States, President Trump was the first US president on the record with anti-vaccine views and was virtually unchecked in his spreading of false COVID-19 treatment information and unsubstantiated conspiracy theories until he was temporarily banned from Twitter, his favored platform, in January 2021 (Hornsey et al., 2020; Twitter, 2021). The willingness to believe conspiracy theories has been identified as a factor in generating and sustaining vaccine hesitancy (Hornsey et al., 2020). As a public figure with enormous reach and influence even in Canada, it is concerning that the anti-vaccine movement may have gained ground from the former US president.

### ***The Impact of the COVID-19 Pandemic***

The COVID-19 pandemic was a defining historical event for the current 20s decade. As an unprecedented global event that shut down international borders, drove people inside their

homes, and crippled hospitals, the COVID-19 pandemic impacted countries, communities, and individuals around the globe in a fashion unknown to the current generation. With the rapid rollout of a new COVID-19 vaccine and varying provincial responses, vaccines became a hot topic and public opinion was split. According to the Angus Reid Forum (2022), 82% of Canadians believe the pandemic pulled people further apart, rather than bringing society closer to together. The politicization of each government's response to the COVID-19 pandemic, in particular at the provincial and federal level, impacted COVID-19 vaccine uptake. Emerging research shows that individuals' confidence in their governments' handling of the COVID-19 pandemic was the strongest indicator of willingness to accept a COVID-19 vaccine or not (Nuwarda et al, 2022). In other words, individuals who thought their government was handling COVID-19 well were more willing to receive a COVID-19 vaccine (Nuwarda et al, 2022). For better or for worse, the COVID-19 vaccine has been inextricably linked with established routine vaccinations in societal conversation. Referencing the 5Cs of vaccine hesitancy, there could now potentially be a sixth "C" which would include feelings toward the COVID-19 pandemic as a predictor of vaccine hesitancy.

### **Strategies to Combat Vaccine Hesitancy**

The literature suggested several promising strategies and solutions to overcome vaccine hesitancy. The two main themes of the strategies included physician-patient clinical interactions and mass communications to the public. The importance of leveraging the physician-patient relationship was noted many times. Specific tools for these clinical interactions include using motivational interviewing and presumptive language when interacting with parents (Braun & O'Leary, 2020; Gagneur, 2020; McGregor & Goldman, 2021). Fairly and accurately presenting

both the risks and benefits of vaccines, addressing pain head on, and using visual aids and stories were also recommended strategies for health care providers (ImmunizeBC, 2021b, p. 7-8).

When it comes to using communication and marketing interventions, the literature repeatedly highlights the need to create communication campaigns based on audience needs and local vaccine-hesitancy factors (Larson et al., 2014; Dubé et al., 2014; Dubé et al., 2016; Dubé et al., 2020; Sondagar et al., 2020). The audience of vaccine hesitant parents is diverse, and as a result promoting uptake requires communications that are tailored to their concerns. Unicef and the Yale Institute for Global Health produced a vaccine messaging guide (n.d.) with evidence-based guidance for fostering demand for immunization through social and behaviour change communications. The guide highlights the importance of knowing the needs of the audience, “understand their *questions and concerns*, know *where the conversations are taking place* and design communications to *fit the needs and motivations* [emphasis added] of communities and individuals” (Unicef, n.d., p. 7). Thomson et al. (2018) echo this and say that effective vaccine communications strategies require an understanding of the *social and psychological factors* that determine the vaccination decisions of different populations with different vaccines.

In the spring of 2021, the Canadian Vaccination Evidence Resource and Exchange Centre (CANVax) shared vaccine hesitancy intervention insights based on the World Health Organizations’ Tailoring Immunization Programmes (TIP) approach (Habersaat et al., 2021). The TIP approach says the first step in finding a solution to vaccine hesitancy is understanding the root of the problem (World Health Organization, 2019b). This could include looking at relevant studies done in a jurisdiction or questioning front-line health providers, parents, or members of the local community (Habersaat et al., 2021). Once the local drivers of vaccine

hesitancy are determined, an effective intervention can be developed based on this understanding and the resources available (Habersaat et al., 2021). It was noted that the TIP approach draws on the Behaviour Change Wheel model to inform the design of interventions to address health behaviours (Habersaat et al., 2021). The TIP approach is valuable a tool that helps providers tailor their vaccination services to meet the needs of patients and caregivers.

### **Research Design**

As the literature showed, when designing vaccine communication interventions, it is important to understand the local drivers of vaccine hesitancy as a starting point. Therefore, I decided to go straight to the source and speak to vaccine-hesitant parents directly. Given my experience as a health care communicator, I decided to include immunizers (health care providers who administer vaccines to children), in my sample population too. I reasoned that these immunizer staff would have a sense of local parents' concerns given their experience working in the community and fielding questions. Based on Dubé et al.'s study (2016), I considered using their approach of connecting with vaccine hesitant parents through a midwife association, since some studies have shown midwife assisted births were associated with incomplete or non-vaccination in Canada, however I opted not to use this approach due to time constraints.

A study of this kind could have been conducted for each community in the region, however, given the scope and short timeline of my project, and being the sole researcher, I opted to speak to a handful of parents and immunizers in each of the three health service delivery areas (HSDA) that the Northern Health region is divided into, so that I would have representation from

each area. Regional representation is very important for Northern Health leadership which is why I did not focus on only one community for this research.

### **Methods**

Now we will discuss the methodology of this research including: data collection, ethical considerations, participant justification, recruitment and sampling techniques, and data analysis. The methods used were informed by studies found in the literature, as well as by my Northern Health colleagues who provided input into the interview question design. When choosing my methodology, my objective was to select methods that allowed me to stay in scope and were reasonable in terms of my individual capacity as the sole researcher.

### **Data Collection**

As part of the ethics approval process, a research proposal that included draft interview questions and recruitment materials were submitted and approved through the UBC RISE online research administration tool. I crafted the interview questions based loosely on the “3C” model of vaccine hesitancy with questions covering the convenience, complacency, and confidence domains. I also drafted the questions based on feedback from my Northern Health immunizations colleagues. A harmonized ethics review was then conducted and granted by the Northern Health Research Review Committee and the Royal Roads Office of Research Ethics. In addition to ethics approval, I was required to secure operational approval from the Northern Health Research Review Committee since Northern Health staff were part of my participant sample. Once my ethics and operational approval were both granted, I began to recruit parent and immunizer participants for online semi-structured interviews. I opted for a one-to-one interview format to

collect rich data that would not have been accessible via other methods such as a survey, and to better understand parents' viewpoints, concerns, and attitudes on vaccination and how those attitudes are formed. The data I collected from the interviews were self-report data. Self-reports are the behaviours, beliefs, and characteristics a person shares with a researcher (Merrigan, 2012, p. 62). All data (the interviews and all associated materials), were saved to my password-protected computer with back-up copies on a flash drive in my home office. I will keep the data on file for two years in case of the unlikely event of challenges to validity.

### ***Ethical Considerations***

I acknowledge that my viewpoint as a Northern Health employee and health care insider impacted how I understood and analyzed my research data. With guidance from my supervisory committee and design input from my Northern Health colleagues, I endeavored to reduce my own bias through careful crafting of my interview questions, so that they were balanced and as unbiased as possible.

Due to the health care nature of this research, there were several ethical concerns that I strove to mitigate. When speaking to parents, they could have potentially shared private and sensitive information which is why I chose to avoid group settings for interviews. The privacy of patients also had to be upheld when speaking to immunizers. Both immunizers and I are bound by strict privacy laws as health authority employees, so I did not anticipate this being an issue. However, I designed the immunizer interview questions so that the immunizers could speak generally about the parents and families they work with and abide by confidentiality more easily.

Due to the small size of communities in Northern BC, it was important to ensure participants remained anonymous to protect their privacy. Community information was needed

to make sure my sample was appropriate (I would need to know what HSDA they lived in), but I removed any identifying information from my interviews.

My main ethics concern was my role as both a Royal Roads graduate student researcher and Northern Health employee. As an employee I am familiar with the confidentiality, empathy, and care that is needed to work with individuals when discussing health care. However, I had to be cognizant of what role I was in for the duration of my project and ensure I upheld the ethical requirements of both Royal Roads and my employer Northern Health. Thankfully, the Northern Health Public Health leadership team was supportive of my research project and agreed to be co-sponsors of the project. Both individuals are the Chief Medical Health Officer and the Vice President of Public Health and form the dyad executive leadership structure for the Public Health department.

### **Participant Justification**

This section is intended to provide clarity on the sample size and the inclusion and exclusion of participants in this study. In choosing my participants, I took a regional approach to ensure there was regional representation from each region of Northern BC. To stay in scope and be realistic with my capacity as the sole researcher, I had to be purposeful in who I did and did not speak to in my interviews. The sections below outline my reasoning for why I included parents of young children and immunizers, and why I excluded valuable physician participants.

#### ***Parent Participants***

My primary target audience was parents of children (age 0-5 years) who had questions or concerns about vaccines for their children and lived in one of the HSDAs of the Northern BC region. I focused on parents with young children because as caregivers, parents are the vaccine

decision-makers for their children. Decisions and actions to vaccinate or not, are influenced by parental attitudes, beliefs, and knowledge (Krishna, 2018). The period from birth to age five is considered the vital beginning of a child's life (Northern Health, 2016). Being immunized during this crucial period protects the child's physical health and reduces the risk of harm from vaccine preventable diseases later in life, as well as impacts whether they may choose to get vaccinated themselves as a mature minor or adult.

### ***Immunizer Participants***

My secondary target audience was immunizers, specifically nurses who routinely administer immunizations to children and live in the Northern BC region. In this study, I define an immunizer as a health care provider who administers vaccination services to families, in most cases, a registered nurse working at a public health clinic. I decided to focus on immunizers because at the Northern Health authority, routine immunizations for children are primarily administered by public health staff in health units/centres. Health unit immunizers are embedded in their communities and may have a sense of common vaccine concerns or questions from parents based on their experience as vaccine administrators. From a recruitment perspective, focusing on health unit immunizers was more feasible for the scope of this project, as there is a direct communication pathway for reaching these staff members, unlike physicians.

### ***Physician Exclusion in this Study***

Interviewing physicians would have been valuable, as the literature emphasizes that they hold a high degree of influence and trust with parents (Dubé, 2016a). Similar to immunizers, physicians would likely have a sense of common questions from vaccine hesitant parents. However, I decided to exclude physicians from this study because I felt that properly engaging



physicians was beyond the scope and time limitations of this study. In the Northern Health region, routine immunizations for children are typically not administered by physicians in their private practices due to the biological product monitoring and immunization documentation requirements. From a recruitment perspective, communicating and engaging with physicians can be challenging, as they are not health authority employees and often use alternate communication channels outside of the health authority. Using these alternate communication channels may have taken additional time and funds, which was another reason why I excluded physicians.

### **Recruitment Techniques and Interview Procedures**

This section outlines the techniques used to recruit the study participants, as well as the semi-structured interview process.

#### ***Recruitment Techniques***

I recruited my two desired participant groups (parents and immunizers) through purposive sampling in two ways: through internal Northern Health (NH) channels and public channels. To reach immunizers, I requested to be on the agenda for a meeting structure of front-line staff managers and leaders. At the meeting, I shared my study and call for immunizer participants. Thanks to my experience working with front-line teams and supporting their COVID-19 vaccine clinic communications during the COVID-19 pandemic, I had positive working relationships with many of the team leads. Many of the leads were willing to share my research ask with their teams. As a result, I was able to recruit my desired immunizer participants relatively easily. Interested immunizers reached out to me directly, we scheduled a time to chat, and then conducted a semi-structured interview online.

For my parent sample, recruitment was not as straight forward, and frankly, very difficult. I started with creating a Royal Roads student researcher Facebook page and created a boosted post advertisement that was geotargeted to people living in Northern BC which generated zero participants. I then attempted to share my post to various parenting and community Facebook groups across Northern BC. Due to the fact my researcher page was so new and perhaps some groups being unfriendly to researchers in general, I was not able to join many groups using my researcher profile. For example, some groups had settings where new accounts less than six months old were auto-declined entry into the group, most likely to prevent nuisance robot accounts from joining. Using my personal Facebook account, I was able to join many groups and share my post from my researcher account, however this too generated zero leads. One person responded, however, when I shared the consent form with her, she declined to participate stating the study was different from what she thought it was and did not elaborate further. After posting to a professional Facebook group I am a member of personally, I was able to thankfully recruit one parent. I reached out to my immunizer contacts as well as personal contacts and asked if they could share my study poster in their communities – this generated zero leads. I also shared my research post to the Northern Health community Facebook groups (NH manages and monitors over 20 groups, approximately one for every community in the region) – this also generated zero leads. My last resort was to personally reach out to parents in my own network, which was how I ultimately recruited the remainder of my parent sample. Using my Facebook friends list, I identified contacts who lived in different HSDAs and that I knew had young children. I then reached out asking if they or any of their fellow parent contacts would be willing to be participate. For four of my parent participants that I sent personal messages to, they

agreed to participate in my research. I tried to employ snowball sampling by asking my parent participants to recruit their friends and contacts, however, this too proved unsuccessful. In theory, snowball sampling seemed like a good approach since parents who are vaccine hesitant may only be accessible through their existing social network, however this approach did not work for me during my short recruitment period of approximately one month (Merrigan et al., 2012, p. 66). It should be noted that even though some of my parent participants were my Facebook friends, all of them were contacts that I would consider acquaintances versus close friends. In other words, I did not know their vaccine views or the vaccination status of their children prior to the study. I vaguely knew they were a parent of a young child (in some cases, the people I reached out had children that were outside of my target age range and I had to decline including them) and that they lived in a region of Northern BC.

During my initial research design, I had hoped to leverage research channels such as the BC Patient Voices Network which I learned uses the REACH BC network to create researcher profiles and research postings on their website. Once a posting is created, the research opportunity is posted on the REACH BC directory and matched to volunteers in the database. Unfortunately, I was not aware that REACH BC requires explicit ethics approval for researchers to use their platform. Due to time constraints, I did not re-submit my ethics application to use the REACH BC platform.

Appendix A shows my unsuccessful social media graphic I used to advertise to Northern BC parents on Facebook and Instagram.

### ***Interview Procedures***

I conducted one-to-one semi-structured interviews through a video-conferencing application and then recorded and transcribed the interviews. I informed all participants before starting the interview that their information would be confidential, they could stop participating at any moment without sharing a reason, there would be no impact to their relationship with their health care provider or employer, and that no personal information shared by parents would be disclosed to their health care providers. All interviews were conducted with the camera on except one individual due to poor connectivity.

Prior to the interviews, I asked the participants qualifying questions to confirm that they were qualified to be part of the study (confirming they lived in the Northern Health region and if they had children under age 5 or were immunizers for young children). During the interviews, I asked each participant 8-9 interview questions based on the “3C” model of vaccine hesitancy with questions covering the convenience, complacency, and confidence domains. When the opportunity arose, I asked clarifying or follow up questions during interviews to further probe and explore a topic with a participant. For a list of all the standardized questions I used during the interviews, see Appendix B. On average, most interviews lasted 25-30 minutes. I allotted a maximum of one hour to each interview, however much less time was needed to complete the interview.

### **Data Analysis**

I analyzed the self-report data that was gathered using discourse analysis which is warranted from standards of the interpretive paradigm (Merrigan et al., 2012, p. 193). Similar to Dubé et al.’s study (2016b) which used analytic induction inspired by grounded theory, I

organized the data into vaccination-focused themes. I started by listening to all my interview recordings and transcribing them manually in detail. I then reread the transcripts and made notes of potential themes and patterns that arose. As I noted themes, I organized the responses to my interview questions into result tables so I could more easily compare each participant's answers. I then went through each transcript systematically and coded each participant's response to the interview questions with my proposed themes. As themes arose, I considered how they were linked together and whether they were expected or not according to vaccine hesitancy literature.

## **Results**

The goal of this research was to understand why and to what extent parents of young children (0-5 years) in Northern BC are vaccine hesitant, as well as to determine what evidence-based communication strategies should be used to increase child immunization rates in the region. The following key themes emerged from the data: findings from previous research, unexpected responses not found in previous research, and responses related to the COVID-19 pandemic.

### **Parent Sample Characteristics**

The parent sample consisted of five parents. Two parents were in the Northern Interior HSDA, one was in the Northwest HSDA, and two were located in the Northeast HSDA. All parents fell on the vaccine hesitancy continuum ranging from accepting but unsure, to accepting some and refusing some but unsure according to the SAGE working group's definition of vaccine hesitancy (MacDonald, 2015). Table 1 summarizes the key characteristics of the parent sample.

**Table 1***Parent Sample Family Characteristics and Vaccine Status and Attitudes*

	<b>Community</b>	<b>Family characteristics</b>	<b>First-time parent</b>	<b>Children vaccination status</b>	<b>Vaccine hesitancy</b>
Parent 1	Prince George	Mother of two (ages 2, 4)	No	Fully vaccinated	Vaccine accepting
Parent 2	Prince George	Mother of five (ages 12, 10, 4, 2, 1)	No	Vaccinated except COVID-19	Vaccine accepting for routine, COVID-19 hesitant
Parent 3	Fort St. John	Mother of one (age 1 year)	Yes	Fully vaccinated	Vaccine accepting, unsure about schedule
Parent 4	Fort St. John	Mother of one (age 7 months)	Yes	Vaccinated except influenza	Vaccine accepting, influenza hesitant
Parent 5	Kitimat	Father of two (ages 10, 3)	No	Vaccinated except COVID-19	Vaccine accepting, COVID-19 hesitant

Three parents had delayed or refused either the COVID-19 or influenza vaccine for their child despite availability of the vaccine to them. Excluding the parent that refused the influenza vaccine, no parents refused or delayed any of the routine immunizations for their children as per the BC schedule for infants and young children (ImmunizeBC, 2021a).

### **Immunizer Sample Characteristics**

The immunizer sample consisted of seven individuals, who were all registered nurses. Two immunizers were in the Northern Interior HSDA, two were in the Northwest HSDA, and three were in the Northeast HSDA. There was representation from small rural communities and larger more urban centres for each HSDA, as well as a mix of newer and more experienced

nurses. Table 2 summarizes the key characteristics of the immunizer sample including a self-reported, anecdotal vaccine hesitancy scale of each immunizer's community or region.

**Table 2**

*Immunizer Sample Characteristics and Their Vaccine Hesitancy Rating of Their Community*

<b>Immunizers</b>	<b>Position/Experience</b>	<b>Community/coverage area</b>	<b>Immunizer's anecdotal community/region vaccine hesitancy scale rating (0 = refusing, 10 = accepting)</b>
Immunizer 1	Registered Nurse, over 2 years	Hudson's Hope	7
Immunizer 2	Public Health Resource Nurse, experience unknown	Fort St. John	6-7
Immunizer 3	Public Health Resource Nurse, over 13 years	Hazelton (also supports Smithers, Houston, Dease Lake)	7 in general. 9 for First Nation communities
Immunizer 4	Public Health Resource Nurse, experience unknown	Daajing Giids (formerly Queen Charlotte)	8-9
Immunizer 5	Registered Nurse, over two years	Vanderhoof	No number given. Community is polarized
Immunizer 6	Registered Nurse, over 20 years	Fort St. John	No number given. Scale is a range
Immunizer 7	Primary Care Nurse, experience unknown	Prince George	8-10 for families she works with. 5 in general

### **Unexpected Interview Question Responses and Themes**

A number of the participants' interview responses and resulting themes were unexpected according to vaccine hesitancy literature. These included the impact of the COVID-19 pandemic, the experience of first-time parents, and the influence of family. They are outlined in detail below.

*The Impact of the COVID-19 Pandemic, First-Time Parent Experiences, and Family Influence*

The following theme was unexpected in terms what previous literature indicated might be typical for this type of study: the positive and negative impact of the COVID-19 pandemic on parent attitudes toward vaccination. Most parents in the sample reported feeling indifferent toward vaccines prior to the COVID-19 pandemic and not caring about them until the COVID-19 vaccine came out. One mother from the Northeast described how she had never worried about vaccines until she became a mother herself, because it was “something you did as a child and wasn’t up to you to worry about.” When the COVID-19 vaccine came out it made her question why we get vaccines at all. Despite having her child fully vaccinated for both COVID-19 and routine child vaccines, she said the pandemic made her question if vaccines are necessary or safe. She shared:

With the COVID vaccine, for us adults it’s something you really had to think about whether you wanted to go ahead with something that new. And then it kind of made you question like why do we do all these vaccines at all? What are the purpose of these? I mean it did for me anyways especially because it was something I was now going through with my child. It made me kind of wonder if they’re all really that necessary or if they’re all really that safe. And there’s not really a lot of information, actually there’s very little information given to you as a parent before you go in for your first appointment to have these vaccines. Like they spew everything out and then they’re like “so you wanna do this or not?” It does raise some concerns.



This sentiment was echoed by an immunizer from the Northwest who shared that the COVID-19 pandemic created a situation where people who normally received their routine vaccinations without question were now second guessing and questioning the whole health care system. They emphasized:

I think [the COVID-19 pandemic] created a lot of a lot of hesitancy that wasn't there before. For sure. There's no question. I still think there are people even in that 70% that are accepting. I don't think very many of them have gone to rejecting vaccines, but I think that some of them have moved towards hesitancy.

The other Northeast mother talked about how vaccines in general were not as common of a topic prior to the COVID-19 pandemic and have become a point of contention in her own family. Her and her husband made the choice to not talk about or share their vaccine choices with family in order to preserve relationships.:

I would say it's become a very private topic. Some of our family is a safe space and some is really not. I don't think our opinions have changed, but the way we would discuss our choices for our child has definitely changed. Before COVID-19 I don't think there would have been a hesitation to say, "oh I'm off to get their 6-month shots." That's definitely changed from a relationship standpoint. With the intense feelings, it's sort of a scary topic. I say scary because some of the conversations I've had are scary when it's with your family.

An immunizer based in the Northeast also noted divides in families that did not exist before the pandemic:

A mom wanted to go ahead with routine vaccines and dad did not 100% based on what was happening with the COVID-19 pandemic. Dad believed it was an eye opener in terms of being a big push for Big Pharma. Prior to COVID-19 they were quite happy to discuss vaccinating and then that took place and his views changed. Mum's did not.

In general, immunizers reported no change in attitude toward routine vaccinations for parents who were vaccine accepting before the pandemic, those they described as “solidly on board.” However, they noted the perception of vaccines in general has changed with the COVID-19 vaccine becoming available, as well as a negative change in attitude toward vaccination for parents and families who may have been hesitant prior to the pandemic. Most immunizers noted that parents with low levels of trust in the health care system and government typically had higher levels of vaccine hesitancy and skepticism.

**The Experience of First-Time Parents.** Concerns about the vaccine schedule was an expected result, however the emphasis on the experience as a first-time parent was not expected. Concern about the vaccine schedule was expressed by one parent who was a first-time mom. She expressed how it was overwhelming as a first-time parent to experience her child getting that many vaccines at once:

I didn't personally cry when she got the vaccine, but my partner was pretty close. And I know lots of people who do. You have this brand-new little person and now you're just poking away at them and it's a lot. It's upsetting that you do that many. So, I think that maybe it could be a bit more of a gentler process if they did less to start. But I'm sure they have their reasons.

Another mother shared her experience navigating being a first-time parent with her partner:

I recently had my first baby. My husband had more concerns more about her being in such a tiny body and being vaccinated. We talked extensively with each other and with our doctor as well as doing our own reading. We decided to go ahead and get them, but he was more concerned. He was not vaccinated as a child – as an adult he is fully vaccinated. We came to the decision together vaccinate her. That was the concern – she’s just so tiny. I was like she’s so tiny, we should protect her. He was like she’s so tiny we don’t want to do anything bad.

**The Influence of Family on Vaccine Decisions.** One reason given for delaying vaccines that was unexpected was following the vaccination decisions of family. One immunizer in the Northern Interior HSDA highlighted this scenario and shared one reason for delaying or refusing vaccines has to do with large families in her community:

There’s a lot of big families here [in Vanderhoof] who have older siblings and really young siblings as well. I’ll have a group come in and it is the mom and the adult daughter with the adult daughter’s child and the same age adult child’s sister kind of thing, and they’ll just do the same thing. It’s a lot of just following what their family did. Another reason they delay or refuse is that they’ve heard horror stories from past family members that got really sick from it or something. A lot of the times, more education can change that attitude. Hearing about the fact that the vaccines are inactivated and can’t give you the disease. Depending on how much trust they have in us here, they’ll change their mind, and they’ll opt to get them.

### **Expected Interview Question Responses and Themes**

Overall, both immunizer and parent participants shared reasons for refusing and delaying vaccines that were typical in vaccine hesitancy literature.

#### ***Complacency and Confidence***

The two parents who delayed vaccinating their children with COVID-19 were concerned with the newness of the vaccine and perceived the risk of their children getting seriously ill from COVID-19 as low. Complacency and a lack of confidence (both classic vaccine hesitancy model concepts) were highlighted by one parent who delayed the COVID-19 vaccine for their children:

Part of the reason we couldn't come to consensus [on the COVID-19 vaccine for our children] was there was a lot of anecdotes. Where people say "oh, I heard this kid had a reaction to it." It creates a bit of doubt over what it does, what the side effects can be. We also weren't necessarily convinced on the risk of COVID itself on that demographic.

Complacency is the perceived low risk of acquiring vaccine-preventable diseases and confidence is the trust in vaccine safety and efficacy (MacDonald, 2015). The mother who delayed the influenza vaccine for her child explained that the main reason she delayed was because she was asked on the spot at their vaccine appointment and was not comfortable making the decision without speaking to her husband and deciding together. The immunizers shared several common reasons for parents to delay or refuse vaccines. A common theme was concern about the vaccine schedule and the number of vaccines children receive at a time. One immunizer in the Northeast shared:

One mother refused to participate in the routine vaccination schedule. She wanted to come in for one vaccine at a time up until the child was two years old. She believed there

were too many pathogens all at once and that it would lead to autism. Regardless of the discussions and the literature that I'd presented [dispelling the autism-vaccine myth], she couldn't see beyond it.

Other reasons for delaying highlighted by immunizers included a previous scary or negative experience with vaccination (i.e., a bad or stressful reaction), believing natural immunity is better, and mistrust of the health care system and government. Immunizers also noted the most common vaccines that families refused or delayed for young children (0-5 years) were: rotavirus, varicella or chickenpox, and the COVID-19 vaccine.

### *Barriers to Getting Vaccinations*

Immunizers and parents did not share any unexpected perceived barriers to getting vaccinated in the Northern BC region during the interviews. The main theme was convenience, a classic vaccine hesitancy model concept that captures access to vaccines.

**Incompatible Scheduling and Hours.** Both immunizers and parents noted that clinic hours are often during the day (8:30am to 4:30pm) and can often be inaccessible for working parents. One immunizer in the Northeast noted:

We're 8:30 to 4:30. So anybody who has a 9 to 5 job or is working full time, that could be tricky. We don't have evening or weekend clinics or from a total just plain old logistics for someone who want it. That's a pain I guess.

Another immunizer in the Northwest highlighted this as well:

I think just making the time to come to the clinic, especially when you have like a young child and they've got naps and you know, if you've got other children and you're just trying to balance schedules. So, I think that's something. It's pretty accessible here [in

Daajing Giids] where we live. But I mean, for older kids, daytime clinic hours are a bit of a barrier for some families. Those after school appointments and those early evening appointments tend to be more popular for older kids, but with the younger kids there's usually a parent, at least where we live, we have pretty minimal daycare, so there's usually a parent who is available to bring them during the day, but having said that, sometimes parents who are working and have their kids in daycare full time, then it requires the parent to take time off work. So that would be a bit of a barrier.

**No Access to Immunizers, Vaccine Supply, Transportation, or Cell Service.** This was a theme that came up for immunizers working with rural and First Nation communities in all three health service delivery areas. One immunizer in a small Northeast community shared an experience about lack of access to immunizers:

It was a matter of availability. The Hudson's hope Health Clinic had a gap of about six to eight months where there was no registered nurse, as the previous one had retired. In terms of capacity, the thing that we struggled with was if there was a nurse to perform the [immunizing] function. The second problem that we had right up until COVID immunizations started to take place was getting the vaccines delivered. We would have to wait until someone was coming down, as in a manager was coming down for a meeting or if somebody was having labs transported. If the weather wasn't compatible then those vaccines didn't arrive, and so we couldn't work appointments. So, there was this kind of long window where either there wasn't a registered nurse or we couldn't get the vaccines locally and parents said I'll just delay, I'll just wait.

Another immunizer from the Northwest noted a similar experience on lack of immunizer access:

In my little region because there are some First Nation communities, and they don't always have proper staffing. So, when they don't have a nurse to provide the vaccine, vaccines get delayed, and then often the parents will end up bringing them to Public Health and we'll try to get them caught up. In my area where we see people who get behind in are folks whose community did not have anybody to vaccinate for a number of years.

A Northern Interior immunizer described transportation and cell service as a barrier to accessing vaccines:

Transportation [is a barrier] a lot of the time. And just the fact that our community's so spread out. There is a reserve [on Saik'uz First Nation]. If the families are from Saik'uz there seems to be a little bit more delaying not because they want to delay, but because they don't have a ride. That's what I found. Or if families are living out on a farm and don't have good cell service or like just phone service in general. That can be a barrier because then they're not phoning to book in, and then they're like, oh, I forgot about them. And then we couldn't contact them to rebook. That kind of thing.

**Lack of Awareness of Immunization Services for Unattached Families.** A common theme for barriers to vaccines was a lack of awareness of immunization services available, especially for families who do not have a primary care provider (in health care this term is called unattached, as they are not “attached” or regularly seen by a family physician or nurse practitioner). An immunizer based in Prince George in the Northern Interior highlighted this challenge:

I think just lack of knowing where to go definitely makes things difficult because we have so many people that don't have a primary care provider. So, we can't just say “oh, go to your doctor and they'll tell you what to do.” And honestly, even if you do have a family physician, sometimes they don't know about the services offered at the Health Units, especially if they're not local. One doctor, he knows that if his clients need vaccines that they go to the Health Unit and talk to the ladies. Whereas a doctor who's not local, or who hasn't been rooted in this community for a while, doesn't know they can [tell patients] just go to the Health Unit second floor and ask to speak to the nurse on call.

A parent in the Northeast highlighted how dire it is to find a primary care provider in her community:

So honestly health care where we are in Fort St. John and the surrounding area it is not easy to get any type of care. To get a family doctor here is next to impossible and once you move into smaller communities it's very frustrating. We've been able to with Public Health get all of our vaccines and it's been fairly straight forward. But getting a doctor – not possible. If you have any follow up issues – that's a struggle. So, other than getting our vaccinations, everything else has been kinda tough. Access to health care in the north



is very difficult. And it's very frustrating and it doesn't really seem like anybody cares that this is such a problem for people. Especially if you're new to a community – we came here six months before we had our baby, so we didn't have any previous doctor or any history here or anything like that. Thankfully we did end up getting a doctor through a friend of a friend but that's not how you should be able to access your health care. It should be there and accessible to anybody, whether you have a friend of a friend or not. That part is rough sometimes for people in these areas.

**Distress and Anxiety Over Causing Pain to a Child.** Both immunizers and parents highlighted how parents can experience distress and anxiety over causing pain to their child when getting them vaccinated, which can be a barrier in getting vaccinated. This theme is common in vaccine hesitancy literature. One immunizer in the Northwest shared:

I have run into this as a reason that people defer and maybe ultimately never get around to vaccinating their kids. But just that distress over causing pain. It's not common, but there's definitely one or two clients that I'm thinking of that it's been a hard sell just because you know babies cry when they get poked with needle. Some parents are more sensitive to that than others, so I think that's a bit of a barrier too. Just knowing that your kid's gonna be distressed and you feel guilty about that and maybe knowing that they're gonna be feeling kind of off for a day or two. Or you don't wanna mess with their sleep or their whatever it is.

A parent in the Northern Interior highlighted her experience with this topic:

For flu or COVID when both kids are getting it at the same time. When they both get it at the same time it's a lot to manage. It gives me a lot of anxiety. They are running around

or crying and fussy. Figuring out how to navigate that. Thankfully I've had help for the most part. One time I was getting my son vaccinated, and the nurses are like "are you ok? You're really flushed." I think I'm fine. They actually got me a juice box and another nurse to come over. It turned out to be I have bad anxiety. I don't realize it's kicked in and I'm sitting there freaking out. I want him to get vaccinated, but my body was like AHHH. I get sweaty and hot and gross every time I get vaccinated with the kids. I have to leave my jacket and give myself time. It's way worse if we're rushed. It's more about me being in the right head space when we go get vaccinated. I know they feed off my energy – mom needs to calm down! It's weird because I'm pro-vaccine yet I'm like freaking out about it for some reason physiologically. They were worried about me fainting. That's why they brought a nurse over. It's normal to feel anxious about getting your kids vaccinated – doesn't mean it's a bad experience. The biggest thing is to reassure parents that you've made the right choice. Even if the kid is sad, it doesn't mean it's a bad decision. I want it to be good, and I want to be calmer about it.

### **Responses and Themes on How to Better Communicate About Vaccines to Parents**

The responses to the questions, "is there anything health care providers or the health authority could do to help parents make informed choices on vaccines or is there a different or better way we could communicate about vaccines to parents?" were the responses I was most interested in hearing from a communications practitioner lens. Participants shared a variety of insights and suggestions. The responses were coded into themes in Table 3.

**Table 3**

*Themed Responses to How the Health Authority/Health Care Providers Could Better*

*Communicate About Vaccines to Parents*

<b>Themes</b>	<b>Responses on How to Better Communicate About Vaccines to Parents</b>
<b>Timing of vaccination information for first-time parents: focus on prenatal visits</b>	Share majority of vaccination information during pre-natal visits, prior to birth. Post-birth not ideal time as parents are overwhelmed. By the time most parents go to the clinic, they have already decided.
<b>Information format</b>	Newborn packages (sent home at the hospital), posters in schools, posters with pros and cons of vaccination, stories and testimonials from local parents (not just official spokespeople like Dr. Bonnie Henry), 1:1 engagement with doctors or nurses, avoid impersonal vaccine communications like letters, conduct outreach, engage virtual parenting communities.
<b>Direct access to health care providers</b>	Having opportunities for parents to ask questions 1:1 with a doctor or nurse. Whether parents vaccinate or not, appointments build rapport and trust, provide opportunity for dialogue and discussion, and space to ask questions.
<b>Suggested vaccine topics to share with parents</b>	Information on how vaccines work, how to find credible information on vaccines, stories and testimonials from local parents, the recommended vaccine schedule for children (what ages they get what vaccines).
<b>Invest in nurse vaccine education</b>	Support immunization conferences, support improving nurses' knowledge on vaccination.

***Timing of Vaccination Information for First-time Parents***

This theme came from both parents and immunizers. The key takeaways were to front-load parents with information at their prenatal visits and not rely on most of the information being shared after birth. One mother from the Northeast shared:

They ask you if you're going to vaccinate at your prenatal appointment so I guess maybe at one of those appointments that could be something they inform you a bit more. All they do is ask you if you're planning on vaccinating – they don't go any further than that so if maybe they could take that opportunity rather than just asking you yes or no. Like ok if you are here's x, y, and z you're gonna start with and give you that information then at least the majority of people go to those prenatal appointments. So, they could have that information beforehand versus after when it's all crazy and you've just had your baby and then getting slammed with all this info which you do have happen afterwards. It's just one of those brochures that's going to get tossed to the side so maybe if it was done before.

The first-time parents noted how they felt overwhelmed when they receive information at the hospital when their children were born. This was also noted by a mother in the Northern Interior, “there's information in the newborn package when you're at hospital. It's a lot when you first have a baby. To even get that conversation going when you first have your child. They send you home with info. They should make sure there's more info in there or where to go.” She emphasized not waiting until parents were at the clinic to decide on vaccinating or not. “Don't wait until they are at the clinic for them to decide. If they are at the clinic, they are most likely pro and getting it. Find other ways. Even grocery stores or where parents would be where they wouldn't be going out of their way.”

### ***Information Format***

All participants shared feedback on the format of how vaccine information is shared with parents could be improved. The main formats suggested were written information formats. For

example, handouts shared in newborn packages that are sent home with parents from the hospital, posters with the pros and cons of information, stories and testimonials from local parents and not just testimonials from official spokespeople like Dr. Bonnie Henry. One parent shared, "I think more clear information posters in schools, anywhere where it's like pros and cons. Where to go to get good [credible vaccine] information, is important." The other main format was one-to-one information. For example, engagements/meetings with doctors or nurses, outreach, and engaging with virtual parenting communities in a small forum or 1:1. No matter the format, participants emphasized the importance of personalizing the information as much as possible. One immunizer in the Northeast noted this:

How we communicate with vaccines is really impersonal. We send out letters to inform people about vaccines that their kids should be receiving, where they are eligible for receiving, and you know it is not a lot of opportunities to clear up misunderstandings with a nurse. So, if I'm a parent, and I get a letter. I may or I don't really have the largest understanding of vaccines or what it all means, and you know what my kids should receive or not? I'm a little confused and then I have to make a call to the Health Unit and ask for a nurse and wait and maybe leave a message for them to come back. If I was someone that was really engaged in vaccines, I might do that. But if I was a parent that's just like whatever about vaccines, I don't think they're gonna take the time out of their day to do that when they have other things to work on as well. So, I just think we can do more about outreach and more like face to face, like, very personable outreach rather than you know here's a letter, read it, and then come back if you have questions.

***Direct Access to Health Care Providers***

While this theme overlapped slightly with the previous, almost all the immunizers emphasized the importance of having direct access to a health care provider to ask questions and build a relationship. One parent shared how she could not get a family doctor in her community initially and as a result relied on family and friends to help find vaccine information for her child,

Pretty much everything that I've had to go through with my daughter I've talked to my mum and she's in health care so she's kinda my go-to person. I also talk to other moms because they're all going through the same thing and different people have different resources, so those types of resources are good and then of course you just go straight to the Internet. I try and at least go to Northern Health or something that you can trust so you know at least the information you're getting is accurate and really pertains to exactly what we're going through.

One immunizer in the Northeast shared a strategy she used in her rural community to create opportunities for increased dialogue and discussion around vaccines:

When a baby is born and they're discharged, they come back to our community here. Then we as public health nurses contact them within the first sort of 48 hours and upon having that discussion, I book an appointment. And so as soon as they can get babe into the clinic, that's when we'll do our first set of measurements and vitals and so on, and a head to toe. And then I have the opportunity to ask them if they're going to vaccinate and if they don't vaccinate, I continue to bring them into the clinic regardless. It gives us an opportunity to be able to offer that suggestion or build a rapport that's intensive enough to start asking about vaccine hesitancy. At other facilities that I've worked at regarding

Public Health, once that initial visit is done, it's largely left up to the parent to book in with their family doctor if there's other questions or concerns they have in mind. If those babes don't get brought in for vaccinations at the eight week mark, there's a tendency for them to not have to see a doctor, as long as you know, as long as feeding is going well, as long as the development of the child appears to be going well, there'll be an initial visit from Public Health, maybe a six week follow up from physician, but then there's no interventions or opportunity to bring it up again. But what we do here in Hudson's Hope is we encourage repeat visits and so we kind of weasel in an opportunity to be able to increase that dialogue and in my opinion, it's probably one of the only ways to really get to the heart of why there's vaccine hesitancy is to increase the follow up appointments of a neonatal other than that.

Another immunizer in the Northeast shared a story about building rapport through one-to-one interactions with patients:

That personal relationship really makes a big difference. For instance, one mom, her story sticks out in my brain. I had a connection with her, and I told her up front, I said, "I'm biased. I am pro-vaccine. I get that and I wanna acknowledge that." I said, "you know your children and so you need to make the best decision and it's not up to me to say whether that's the right one or wrong but what I can do is try to give you information and you can sort through." So, I had gone off and particularly that one issue with the MMR vaccine I had gone and found the original study that had been done. And yeah, and so that was huge. But none of that would have happened if I wouldn't have had a relationship with her. And in fact, my relationship with her started because of her child's

high needs, not because of vaccination. That would have never come back on the table, but it would because I was doing some other stuff specific to the autism and supporting as far as that. Then we started talking.

The same immunizer also touched on the importance of building trust and connection with patients when communicating one to one.

From that whole continuity point of view, I feel like a whole bunch of external things are happening that are really watering that ability to connect and trust and build rapport. But there's major big things happening internally to Northern Health. It is really, really watering that down as well too. As far as being able to put a face to a name and that sort of thing. I remember when I very first started working in 2003. So, we have a couple of big Mennonite communities. We have a couple of the communities usually an hour or further out of town, that sort of thing. When I first started working here, we would go out to their places and start to internalize. And so even that was huge, like just being present in their community, being willing to go to them as well as when we run out there, we were requested to wear skirts like long skirts, you know, that kind of thing. And so, we did. And that was super interesting. They were some of my favorite days to be able to go out and connect with us. And if we weren't willing to do that, we never would have seen those people walked through these doors. I know that we're short-handed [now]. There's lots of reasons why we can't necessarily meet those needs anymore. Those little groups that are like hard to connect with. But if we want to keep [building those relationships]. It just depends, are we focusing on connection and trust? Or are we focusing on numbers?



*Vaccine Topics to Share with Parents*

Several vaccine-related topics were suggested when better communicating about vaccines with parents. They included information on how vaccines work, stories and testimonials from local parents, and the recommended vaccine schedule for children (what ages they get what vaccines). In terms of how vaccines work, one parent from the Northeast shared, “I wonder if having more generalized information about how vaccines work was included with vaccinating your children because maybe that’s a piece that we were missing which is why my husband had so many more questions. Maybe it was included, I’d have to go look back. It was also a crazy time in there you know. It was a fog. It was a weird time!” Another suggested topic was how to find credible information on vaccines. One immunizer in the Northwest highlighted why this topic is so important in the context of misinformation and health literacy:

One of the things that's difficult is that all of this is very complicated stuff. It's not simple stuff, so it's easy for people to provide misinformation about something that is not something that you can understand in five minutes. And so, people want to understand things in 5 minutes. They want simple things. Misinformation is simple. It takes two seconds to put out a document that will cause somebody to believe that if they get the vaccine, they're gonna die. But it can take a long time of study and careful, careful reasoning to understand why that document shouldn't be taken the way that you're taking it at face value. And so that's the really complicated and difficult part about the whole process is that the majority of people are not trained in science, they're not trained in health care, they're not trained in by radiology, or immunology, or any of these things. You have a very complicated product. The product is simple, give you a needle, right.

And people can understand there's something in there that makes me immune. How it makes them immune, why it makes them immune, how your body responds to it, disposes of the product that you put in their body, you know, toxins that might be there. All of those things are complicated. And so, the difficulty is that if a person loses trust in the health care system, in their health care providers, in their government, in these things, that they have their best interest in mind, then they're going to want all of these. Then they start buying into these other things and it's just tragic because you know, how do you find the way to take the time to communicate with a person in the length and detail that's required to overcome a quick YouTube [video]? It's very difficult to find that space and where do you find it? And so, for groups of people, there are people who have higher literacy levels, they have a better understanding of science, they have a better understanding of health care, and they often can find their way through to the details that they need to find so that they can feel comfortable doing the things that they need to do. And even they get confused sometimes. I mean we have physicians that are promoting the dangers of vaccines and this kind of stuff. How do you deal with that? It's just like, yeah. Keep chugging away with what we're doing.

A parent from the Northern Interior shared how stories and testimonials from local parents could be effective:

I feel like everyone was giving Dr. Henry a lot of grief. Because she was the face. When you're the face of an organization, you're the person getting flack. I feel like it's hard, especially in a crisis. We're at a point now where if we could get more parents, more parents like me who were pregnant, who had no choice. More people and faces and

voices, rather than one person. Because we live in a world where with social media you can swipe up and ignore – it creates crazy crowds. If there was more research, I mean that will come in time and it can't speed up. But more opinions and personal experiences. I feel like when you're introducing something new to mass population you need to introduce comfort and reassurance with it as well. You can only have one person saying this is good for so long before her hair goes gray, and everyone is throwing rocks.

Another immunizer from the Northern Interior recommended focusing on sharing information about the recommended vaccine schedule for children, and being clear on what ages they get what vaccines:

Advertising about the ages where the vaccine should be done, because I still find a lot of parents think that there's a one month, the three month, and that kind of thing. They're not sure about the ages. Even if there was a specific Northern Health website that they could go to that has the specific vaccines, like could click on a link to like two months and then it's a little bit easier to find, versus trying to look on HealthLinkBC. It can be a little bit overwhelming and there's a lot of vaccines that aren't necessarily applicable to what they're looking for.

### ***Investing in Immunization Education for Nurses***

Lastly, an immunizer in the Northeast highlighted the importance of supporting nurses' knowledge on vaccination. She shared:

Once upon a time, whenever someone presented in Public Health, we had a fantastic program for everything – for breastfeeding, for infant development, for whatever. I would say slowly over the years that has disintegrated based on leadership. In 2015, whenever

we moved to primary care, we have seen a real, like a lot of movement. Years ago, we had a core group of solid, knowledgeable, wise, experienced nurses. Partly between education that happened regularly, it was a total priority which included immunizers through conferences and that sort of stuff. So, we had a better base of knowledge – was more top of mind because one or two of us had just gone learning. I don't even know in the last 10 years if a single person here has gone to immunization conferences. There's only a couple of us who remember those days. Especially with primary care and then COVID, there's just been a complete revolving door around here and we have issues. People that would typically work there full time or part time are only working here casual. I feel like with the primary care thing, we lost our dedicated Public Health manager. So, these kinds of things aren't prioritized. We're getting led by people who don't have a solid knowledge or working background on Public Health. So, it's kind of like out of sight out of mind. And then like I said, even if we do have a few of those people here on the ground, I just feel like we're still spread to so many other areas. We need well-versed Public Health nurses on the ground. But when somebody comes or makes a comment, you can immediately respond and not have to dig deeper. I feel like improving our knowledge base is huge.

### **The Impact of the COVID-19 Pandemic**

Unsurprisingly, the impact of the COVID-19 pandemic was a reoccurring theme in the interview responses. Key related topics are included here.

***Better Vaccine Supply Access Due to COVID-19***

One topic was how the COVID-19 pandemic positively benefitted some communities by giving them easier access to vaccine supply. Prior to COVID-19, one immunizer from the Northeast shared how her community had trouble routinely securing vaccine, which impacted her ability to book and provide vaccination appointments. She noticed how routine immunizations increased once routine vaccines were able to be regularly shipped with COVID-19 vaccine.

As soon as COVID opened up, what happened is we could order COVID vaccines every week and so then we had a transportation system that was enacted. And once they pulled the trigger on that, all of a sudden, our bookings for routine vaccines went up because the parents could call, we could book and make it happen. There was the odd occasion where we would have to phone a series of parents throughout, you know, a three-week period and just cancel everything because of vaccines didn't arrive due to weather. In terms of COVID, we did see definitely a flip of the switch as soon as we could even ride it out on the coattails of COVID.

***Vaccines as a Societal Conversation Due to COVID-19***

Another topic was that some parents expressed how COVID-19 opened a dialogue about vaccines that was not as widely spoken about before the pandemic. One parent shared, “it was not as common of a topic of conversation among my peers or family members before.” This was a double-edged sword as one parent shared earlier how it had polarized her family, however, another parent expressed how the pandemic had brought a greater general awareness of vaccines which she thought was positive and prompted parents to be more engaged in their child’s health

care. The parent shared, “I think that’s maybe a good thing with the COVID vaccine that it did make people think a little bit more about what they are, I guess not choosing but what they’re putting into their children and whether or not they want to. You don’t really think about it until you have kids cuz you don’t have to.” On the other hand, one immunizer highlighted their experience,

One of the examples like can give is that mom wanted to go ahead with routine vaccines, and dad did not to, and that was 100% based on what was happening with the COVID-19 pandemic.

### ***Local Political Sentiment and the Impact on Public Trust and Vaccine Uptake***

One experienced immunizer in the Northeast noted how politics may be impacting public trust and vaccine uptake, as the region she serves is largely conservative. “We’ve had two governments in power that most people up here can’t stand. They feel like we [health care workers] might be the face of those governments. People don’t understand the way the health care system is set up enough to be able to distance that. We’re written off a lot quicker now than we were before.” Both parents in the Northeast commented on this theme interestingly:

It’s a very different attitude here [in Fort St. John] compared to other communities. I don’t want to say redneck because that’s not actually correct but like anti-government basically. People still everyday drive around with their freedom flags and their rally and all the power to you, do what you want. I have never experienced so many people with no reasoning behind their decisions basically just go anti-vax, anti-everything and they can’t tell you why. It’s crazy. It was a huge shock to me that so many people felt this way but didn’t have any education or any information to back up their opinion. Made me realize

that there's so much of that out there about everything – about all vaccines, about all subjects in general. That people just take one side and they have no clue why. They just do. It's wild. It just seems like there's a huge lack of education here in regards to the COVID vaccine in particular and now I'm curious if that will translate to people that are becoming new parents because it's so recent if they're going to be anti-vaccine in general and not know why. The sad thing is most people don't have a reason for why they feel that way. They're like f\*\*k Trudeau and that's the reason – well that's not really a reason. I'm curious if that will translate into all the typical vaccines that we've been given – I hope it doesn't because a lot of that will create major issues, but I wouldn't be surprised if it does.

The other parent in the Northeast shared a similar sentiment:

I think even if you had all of the information out there, those who choose not to trust would still not. So, I don't know what the answer is. This part of the world, Fort St. John, is very conservative and very redneck and I say that in very stereotypical ways. Like of course not everyone but on Saturday I got stuck in the convoy last weekend. I couldn't believe it. It was miles long. It was going 50km/hour. How do I get out of here! I thought it was kinda over. It's not! It's not over in Fort St. John. People are passionate. I don't know what they're fighting for, and I don't think they know either. But I guess I feel just as strongly as they probably feel on the other side. I always remind myself of that.

This research shed light on several reasons why parents may be vaccine hesitant in the Northern BC region. To summarize my findings, the key unexpected results were that Northern

BC parents in this study were influenced by the COVID-19 pandemic; they were impacted by the experience of being a first-time parent; and they were impacted by family dynamics. The key expected findings were that parents were impacted by classic vaccine hesitancy factors like complacency (not believing or understanding the seriousness of a vaccine-preventable disease) and confidence (having low or no trust in vaccines or the system that delivers them), and convenience (the extent to which vaccines are available, affordable, and accessible, and the appeal of immunization services) (MacDonald, 2015; BC Centre for Disease Control, 2021b).

### **Discussion**

Several reasons why parents may be vaccine hesitant in the Northern BC region were uncovered in this research. The key findings, a discussion of the implications, and strategic communication recommendations informed by my findings are outlined in this section.

#### **Local Vaccine Hesitancy Factors That Influence Northern BC Parents**

To summarize, the Northern BC parents in this study were influenced by the COVID-19 pandemic and how it played a role in increasing hesitancy and awareness of vaccines in general; they were impacted by the experience of being a first-time parent and the overwhelm of information; they were impacted by family dynamics, especially in small rural communities; and they were impacted by classic vaccine hesitancy factors like complacency and confidence (MacDonald, 2015). They were also impacted by incompatible hours and scheduling, lack of access to vaccines or immunizers to administer them, a lack of awareness of vaccination inquiry services, and rural living realities like lack of transportation or cell service to access vaccine



appointments – all of which can be categorized under the classic vaccine hesitancy factor of convenience (BC Centre for Disease Control, 2021b).

### ***The COVID-19 Pandemic***

Recent literature says that it is too soon to tell what the impact of the COVID-19 pandemic has had on routine child immunizations, however this research confirmed that there has been an impact to parents' perceptions about vaccines in Northern BC. As Gagnon et al. (2023) noted, “concerns about vaccine safety and efficacy as well as online misinformation/disinformation were ubiquitous, especially since the beginning of the COVID-19 vaccine roll-out” – the same phenomenon was found in the Northern BC region. Both the immunizer and parent participants in this study highlighted that the COVID-19 pandemic brought a larger awareness of vaccines which was positive, however, they also emphasized more hesitant attitudes toward vaccination which was negative. According to the Behaviour Change Wheel COM-B model, this is known as social opportunity which can be defined as the “opportunity afforded by interpersonal influences, social cues and cultural norms that influence the way that we think about things,” (Michie et al., 2014, p. 63). As Gagnon et al. (2023) pointed out, online misinformation and disinformation created a barrier to vaccination, which one immunizer from the Northwest emphasized,

Social media has made it really, really hard to deal with this particular pandemic. I think it's contributed in a huge way to the to the struggles and the, in my opinion, many, many deaths that have occurred as a result of the things that have gone on and people have been allowed to say and the things that they've been able to spread.

### *The Experience of Being a First-Time Parent*

This vaccine hesitancy factor was an unexpected result in this study. As many of the parent participants emphasized, the timing and format of sharing vaccine information to first-time parents is crucial. Parents described birth and the period following as a “fog,” which the immunizer participants revealed that the majority of vaccination information is shared. Referencing the COM-B model, first-time parents could be described as experiencing low automatic motivation due to this “fog”, which can be defined as automatic processes involving emotional reactions, desires, impulses, inhibitions, drive states, and reflex responses (Michie et al., 2014, p. 63). One immunizer based in Vanderhoof said they provide baby packages which include vaccination information – other immunizers confirmed they also send home baby packages home with new parents from the hospital. The Vanderhoof immunizer said parents in her community do read the baby package information, but it appears that this practice is mismatched to when parents are most receptive to receiving vaccination information. Since physicians were excluded from this study, it is hard to say what the effectiveness of prenatal visits are in Northern BC when it comes to sharing vaccination information, however the literature notes that one of the biggest predictors of vaccine acceptance is a recommendation from a health care provider (Dubé et al., 2016a; Dubé et al., 2016b; Gagnon et al., 2023). Immunizers in this study shared that prenatal visits are conducted almost exclusively by physicians in the Northern Health region, however this raises the question, what happens if a pregnant person is unattached and does not have a family physician? This is a reality that many Northern British Columbians face, as one in five people in British Columbia do not have a family doctor and cannot get one (BC Family Doctors, 2022).

### ***The Impact of Family Dynamics***

Another unexpected result was the impact of family dynamics. One immunizer based in the small rural community of Vanderhoof noted a trend of vaccine hesitant parents refusing or delaying vaccination based on what their family members had previously decided. This example of hesitancy can be attributed to individual and group influences (personal experience, beliefs, attitudes) that are captured in the vaccine hesitancy matrix of the SAGE working group on vaccine hesitancy (World Health Organization, 2014). In addition to individual and group influences, the matrix also captures contextual influences (media, politics, culture, religion) and vaccine-specific issues (vaccine risk/benefit, knowledge and attitude of health care providers). Referencing the COM-B model of behaviour change, these family dynamics could be described as impacting parent's social opportunity which includes interpersonal influences such as family (Michie et al., 2014, pg. 63).

### ***Complacency and Confidence***

Complacency (not believing the seriousness of a vaccine-preventable disease and believing vaccines are unnecessary) and confidence (having low or no trust in vaccines or the system that delivers them) were expected vaccine hesitancy factors that affected Northern BC parents in this study (MacDonald, 2015). Both parents and immunizers shared examples of parents exhibiting complacency and shaky confidence toward vaccination for their children.

### ***Practical Vaccine Hesitancy Factors***

Several expected vaccine hesitancy factors were highlighted in this study. They can be categorized as practical factors or issues as per Gagnon et al. (2023), which are defined as someone's "previous experience with past vaccinations including barriers in access to

vaccination services (such as financial barriers, geographical barriers or appointment availability barriers) as well as systemic/structural barriers in the way vaccination services are delivered.” In the Northern BC context, these practical factors specifically included: incompatible hours and scheduling, lack of access to vaccines or immunizers to administer them, a lack of awareness of vaccination inquiry services, and rural living realities like lack of transportation or cell service to access vaccine appointments. These factors can be captured under the classic vaccine hesitancy model of convenience, which can be defined as “the extent to which vaccines are available, affordable, and accessible, and the appeal of immunization services” (BC Centre for Disease Control, 2021b). Using the COM-B model, these factors can be classified as physical opportunity, which is defined as an “opportunity afforded by the environment involving time, resources, locations, cues, and physical ‘affordance’” (Michie et al., 2014, p. 63).

### **Parent Participant Recruitment Challenges**

Besides the interview results, a key finding in this research was how difficult it was to recruit vaccine hesitant parents. As I detailed earlier, I attempted several recruitment techniques to no avail. Given the hesitant nature of my target participants and their potential mistrust in the health care system, I expected some difficulty in recruitment, however I was surprised and disappointed that I had to resort to recruiting through my personal network. I thought that snowball or network sampling would be effective, as under-represented individuals may only be accessible through one another, however this too proved ineffective in garnering participants (Merrigan et al., 2012, p. 66). I employed similar marketing tactics as the anti-vaccine movement by using neutral language and avoiding the explicit label “anti-vaccine” in my advertisements, however this tactic still failed (Dubé, 2014). Looking back, I think recruitment could be aided

by a longer data collection timeline. Given the scope of my project, it was not feasible to have a data collection period that was months long, however, I think more time would have helped spread the word. For example, some of my immunizer colleagues posted my recruitment poster to their clinics and community bulletin boards, however the poster may not have been up long enough to be effective. I believe that having a website to generate leads or a monetary incentive may help with recruitment in future. I learned through my attempted social media ads that it would have been ideal to have a webpage to direct people to for more information about the study and the participant requirements, as having interested participants contact me via email did not work. A landing page could have been created through the many free website options available. Since I did not submit a website during my ethics proposal, I was unable to create and use one after my ethics approval was granted without having to resubmit. I think offering a small honorarium would have helped recruitment. In Dubé et al.'s study (2016b), they gave a small honorarium to mothers who participated in their study, however, the exact amount was not specified. While I would not have been able to give an honorarium to staff who participated, as cash or gift cards are considered a taxable benefit and strongly discouraged by the Northern Health Finance Department, I may have been able to get Northern Health funding to cover an honorarium for my parent sample, especially given the small sample size. Again, I did not include an honorarium in my ethics proposal and was not able to resubmit due to my timeline. Overall, my recruitment experience could be useful for other scholars who wish to study vaccine hesitant parents.

**Evidence-Based Communication Strategies**

In conducting this research, I was inspired to create a research-backed and evidence-informed communications plan while drawing on my experience as a communications practitioner, to increase vaccine uptake in the Northern BC region. I propose three phases of this plan: phase one, to better promote existing local services (including vaccination services specifically), phase two, reinforcing the social norm of vaccinating through a communications campaign, and phase three, changing practices and norms by tackling the larger task of building trust with parents as a health authority. Table 4 gives a brief overview.

**Table 4***Strategic Communication Recommendations*

Phase 1 Communication Recommendations (low effort and time required)		
<b>Objective</b>	<b>Concept/example</b>	<b>Tactic</b>
<i>To better promote existing local vaccination services</i>	Ex. The nurse on call at the Northern Interior Health Unit in Prince George	<ul style="list-style-type: none"> <li>• Social media post on the Northern Health Prince George Community Group</li> <li>• Share to Prince George parent Facebook groups</li> <li>• Disseminate through doctors (tear away pads and posters)</li> </ul>
Phase 2 Communication Recommendations (medium/high effort and time required)		
<b>Objective</b>	<b>Concept/example</b>	<b>Tactic</b>
<i>Re-enforcing the social norm of vaccinating</i>	“You made the right choice” campaign highlighting real Northern BC parents	<ul style="list-style-type: none"> <li>• Reassure parents by celebrating their choice to vaccinate.</li> <li>• Prizes: hot drinks</li> <li>• Key message: we get it, vaccinating your kids can be stressful, have a coffee on us</li> </ul>
Phase 3 Communication Recommendations (high effort and time required)		
<b>Objective</b>	<b>Concept/example</b>	<b>Tactic</b>
<i>Changing practices and norms</i>	Examining how to build trust with parents as a health authority	<ul style="list-style-type: none"> <li>• Overhauling NH website (creating easy-to-find information on child vaccinations)</li> <li>• Soliciting parent feedback on hospital baby packages (focusing on immunization information)</li> <li>• Create strategy for engaging parents during prenatal visits by collaborating with physicians</li> <li>• Storytelling – sharing positive vaccination anecdotes from local parents to counter negative narratives on vaccination</li> </ul>

***Phase 1: To Better Promote Existing Local Services***

In phase one the goal is to achieve quick wins and implement communication interventions that require minimal time and resources. When speaking with my immunizer

sample, I learned about public health vaccination services that are not routinely promoted on the Northern Health communication channels (the public website and social media channels), such as the Northern Interior (NI) Health Unit nurse on call function. One nurse who is based out of the NI Health Unit informed me about this function,

Parents don't know their options for rebooking, so if they miss the child health circuit, not everybody knows oh, you can just go upstairs and ask to speak to the nurse on call and get that done. Before I started in health care, I didn't know that. The Northern Interior Health Unit on call nursing is 250-645-8963.

The immunizer explained to me that the Prince George-based function serves as a direct line for the public to speak to a public health or primary care nurse who can speak about vaccines as well as other topics such as pregnancy counselling or other public health questions, “we can help guide and navigate the system. It’s just getting that information out there.” As a regional health authority, it would be prudent to conduct a community-by-community audit to determine local parents’ options when they have vaccination questions and to determine if a similar service exists in each community. This would mean collaboration between the regional Public Health department, the regional Communications department, and the front-line operations team for each community. In the case of Prince George, since it is the largest community and the hub for all health care services in the North, the Health Unit nurse on call service could easily be promoted through existing Northern Health communication channels such as the Northern Health Prince George community Facebook group and the Northern Health website. Promoting this function may help mitigate the convenience factor of the vaccine hesitancy model, a significant factor that includes everything from the physical availability of vaccines, to the



appeal of immunization services, and the ability to understand vaccines (MacDonald, 2015). It may also educate parents and aid their reflective motivation (reflective, self-conscious brain processes that energize and direct behaviour) according to the COM-B model (Michie et al., 2014, p. 114). By promoting a service that connects parents directly to a health care provider, who hold high levels of trust with parents, and making it more widely known, barriers to vaccination could be reduced in Northern BC (Dubé et al., 2016; Schellenberg & Crizzle, 2020).

### ***Phase 2: Reinforcing the Social Norm of Vaccinating***

The goal of phase two is to focus on parents who are on the accepting end of the vaccine hesitancy scale by conducting communication tactics that require moderate time and resources. Coming out of the COVID-19 pandemic, it is more important than ever to not lose ground to vaccine hesitancy and make sure parents who are vaccine accepting remain accepting of them. As the results of this study showed, parents may be *more* vaccine hesitant now thanks to the COVID-19 pandemic. Therefore, I propose focusing on this cohort of parents by acknowledging, celebrating, and reinforcing their choices to vaccinate their children. A communications campaign called “You Made the Right Choice,” could be executed, with the overall goal being to reassure and celebrate parents who have chosen to vaccinate and ultimately reinforce the social norm of vaccinating. Behavioural and social drivers of vaccination could be tied into the campaign by focusing on social processes, which are defined as social experiences related to vaccines, including social norms about vaccination and receiving recommendations to be vaccinated (World Health Organization, 2022). The WHO’s behavioural and social drivers of vaccination guidance document (2022, p. 31) shares interventions for social processes that have been shown to increase vaccination. They include: community engagement, positive social norm messages,

vaccine champions and advocates, and recommendations to vaccinate from health workers. The campaign could use local parents to highlight real Northern BC parents who chose to vaccinate and want to encourage their peers to do the same. This would serve to reinforce social norms, which are associated with vaccination decisions and may increase vaccine intentions (Unicef, n.d., p. 18). Using the COM-B model, this would be an intervention example of modelling, which would help parents feel more positively about the desired behaviour (vaccination) (Michie et al., 2014, p. 118). To engage with the online parenting community and share positive social norm messages, the parent champions could encourage their parenting peers to submit why they chose to vaccinate for a chance to win a small prize such as a coffee shop gift card. Using an insight that was shared from a parent participant in this research as an example, the following edited anecdote could be shared, “it’s normal to feel anxious about getting your kids vaccinated – it doesn’t mean it’s a bad experience. Even if your kid doesn’t enjoy getting a needle, it doesn’t mean it’s a bad decision. You’ve made the right choice.” As I learned from one parent participant, the experience of taking children to get vaccinated and trying to “keep it together” as a parent can be difficult, and she shared that she often treats herself to a coffee after successfully taking her kids to their vaccine appointments as a reward to herself. Keeping with this theme, the prizes could be shared with the message, “We get it, vaccinating your kids can be a lot to handle. Way to go, you did it! Have a treat on us.”

### ***Phase 3: Changing Practices and Norms***

Phase three of my communication recommendations requires moderate to high time and resources compared to the other two phases. The overall objective is to tackle the larger task of building trust with parents as a health authority, which of course would not happen overnight. I

propose doing this through a few specific tactics: overhauling the Northern Health webpages on childhood vaccines by creating easy-to-find information, soliciting parent feedback on hospital baby packages through the Patient Voices organization, collaborating closely with physicians to create a strategy for engaging parents during prenatal visits, and using storytelling to share positive vaccination anecdotes from local parents to combat the negative anecdotes.

As an immunizer participant emphasized, ensuring childhood vaccine information is easy to search and understand on the Northern Health public website is important. By having this information more easily accessible, it would help reduce information barriers for parents and help establish trust if parents knew they could rely on and find the immunization information they needed on the Northern Health website. Dubé et al. (2020, p. 49) noted that vaccine-hesitant individuals are active information seekers who look for “balanced” information that share the pros and cons of vaccination to make an informed decision about vaccines. They also noted that their information needs are not usually fulfilled with usual information from public health authorities (Dubé, 2020, p. 49). A father in this study shared how his wife and him process information very differently. He shared that he appreciated more statistics and data, whereas his wife preferred stories and other anecdotes. This means that a blend of webpage information may be required to satisfy parents’ information needs such as links to statistics and embedded testimonials or stories on why parents chose to vaccinate their children. Soliciting parent feedback on take-home baby packages would help improve how child vaccination information is presented. By working with the Patient Voices network, local parent perspectives could be captured which would better tailor the messaging and information and ensure the baby packages are meeting the information needs of new parents.

As the literature repeatedly says, doctors are a trusted figure for parents and their recommendations to get vaccinated carries a lot of weight and influence on parents' decisions to vaccinate their children or not (Dubé et al., 2016a). Unfortunately, as a health authority there is no line of sight into prenatal visits that take place in private practices. Therefore, making a targeted effort to collaborate with family doctors in the region to put a focus on addressing vaccine hesitancy in prenatal clients may help increase rates. This collaboration would require proper engagement and dedicated budget to ensure doctors were compensated for their time. However, many individuals do not have a family doctor, so targeted and innovative thinking would be needed to address how to provide prenatal vaccination services to unattached patients.

Lastly, storytelling could be a powerful way to build trust and build parents' desire to have their children vaccinated. As human beings we understand our world through stories as much as facts (Unicef, n.d., p. 9). The Unicef vaccine messaging guide highlighted how statistics and facts are not as effective as narrative tactics because humans are typically not good at understanding statistical probabilities (Unicef, n.d., p. 9).

### **Reflections on the Study Design**

All the participants in general were situated on the accepting end of the vaccine hesitancy scale and were willing and interested in participating, which skewed the results compared to if there had been more parents closer to the refusing end of the scale or in the middle. As parents and immunizers in this study pointed out, some vaccine hesitant parents choose not to engage with the health care system at all, therefore it was challenging to reach these parents and attempts were unsuccessful. One immunizer participant pointed out bias in the phrasing of one interview question: "for the families you work with." They pointed out that this may cause immunizers to

only think about the families they work *with*, since the majority of families seen at health units/centres are vaccine accepting by the time they get to the clinic. They highlighted that they do not often interact with parents who *do not* want to engage with the health care system and may be vaccine refusing altogether. Despite being biased toward parents who are on the accepting end of the vaccine hesitancy spectrum, this study highlights an important population that is essential to keep on the accepting side. By maintaining vaccine accepting parents, we can make sure we do not lose precious ground in the fight against vaccine hesitancy and refusal.

### **Conclusion**

This research shed light on several reasons why Northern BC parents of young children (age five and under) are vaccine hesitant. The unexpected reasons included the COVID-19 pandemic and its role in increasing hesitancy and awareness of vaccines in general, the overwhelming experience of being a first-time parent, and the impact of family dynamics in small communities. This research also revealed the extreme difficulty in recruiting and studying the vaccine hesitant parent population. Overall, most of the research results fell into the Behaviour Change Wheel (BCW) COM-B components of motivation and opportunity, specifically: physical opportunity, social opportunity, reflective motivation, and automatic motivation (Mitchie et al., 2014). In the BCW framework, communications and marketing is a key policy category used in the intervention functions of education, persuasion, incentivization, coercion, and modelling (Mitchie et al., 2014. 248). For each of these intervention functions, an evidence-based behaviour change technique is available (Mitchie et al., 2014. 150). Using the Behaviour Change Wheel, evidence shared in the literature, and the anecdotes shared from the participants of this study, strategic communications recommendations were then shared that

could help increase vaccine uptake. The WHO's Tailoring Immunization Programmes (TIP) approach was the inspiration behind this research, however the findings were by no means conclusive. The TIP approach, which uses an adapted version of the BWC COM-B model to map a pathway from research findings to intervention design, could be continued and further research on why Northern BC parents may be vaccine hesitant could be conducted to enrich Northern Health's understanding of parent vaccine hesitancies and better understand the local barriers to vaccination (World Health Organization. (2019b).

### References

- Angus Reid Institute. (2022, March 10). *COVID at Two: Vast majorities say the pandemic has pulled Canadians apart, brought out the worst in people*. <https://angusreid.org/covid-19-two-year-anniversary/>
- BC Centre for Disease Control. (2021 a). *Immunization Coverage in Children by the Second Birthday 2011-2020*. <http://www.bccdc.ca/resource-gallery/Documents/Statistics%20and%20Research/Statistics%20and%20Reports/Immunization/Coverage/2yo%20Coverage%20Birth%20Cohort.pdf>
- BC Centre for Disease Control. (2021b). *Immunization Communication Tool for Immunizers*. <http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Immunization/Vaccine%20Safety/ICT-2021.pdf>
- BC Family Doctors. (2022, July 19). *Ongoing media coverage on BC's family doctor shortage*. <https://bcfamilydocs.ca/ongoing-media-coverage-on-bcs-family-doctor-shortage-2/>
- blogTO. (2021, December 21). *Toronto anti-vaxxer Chris Sky just got banned from Twitter and people are reacting*. <https://www.blogto.com/city/2021/12/toronto-anti-vaxxer-chris-sky-banned-twitter/>
- Braun, C., & O'Leary, S. T. (2020). Recent advances in addressing vaccine hesitancy. *Current Opinion in Pediatrics*, 32(4), 601–609.  
<https://doi.org/10.1097/MOP.0000000000000929>
- Destination BC. (n.d.). *Northern British Columbia*. <https://www.hellobc.com/places-to-go/northern-british-columbia/>

- Dubé, E., Vivion, M., & MacDonald, N. E. (2014). Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: influence, impact and implications. *Expert Review of Vaccines*, *14*(1), 99–117. <https://doi.org/10.1586/14760584.2015.964212>
- Dubé, E., Bettinger, J. A., Fisher, W. A., Naus, M., Mahmud, S. M., & Hilderman, T. (2016a). Vaccine acceptance, hesitancy and refusal in Canada: Challenges and potential approaches. *Canada Communicable Disease Report*, *42*(12), 246-251. <https://www.proquest.com/scholarly-journals/vaccine-acceptance-hesitancy-refusal-canada/docview/1865218029/se-2>
- Dubé, E., Vivion, M., Sauvageau, C., Gagneur, A., Gagnon, R., & Guay, M. (2016b). "Nature does things well, why should we interfere?": Vaccine hesitancy among mothers. *Qualitative Health Research*, *26*(3), 411–25. <https://doi.org/10.1177/1049732315573207>
- Dubé, E., Gagnon, D., Vivion, M. (2020). Optimizing communication material to address vaccine hesitancy. *Canada Communicable Disease Report*, *46*(2-3), 48–48. <https://doi.org/10.14745/ccdr.v46i23a05>
- Featherstone, J. D., & Zhang, J. (2020). Feeling angry: the effects of vaccine misinformation and refutational messages on negative emotions and vaccination attitude. *Journal of Health Communication*, *25*(9), 692–702. <https://doi.org/10.1080/10810730.2020.1838671>
- Flew, T. (2021). The global trust deficit disorder: a communications perspective on trust in the time of global pandemics. *The Journal of Communication*, *71*(2), 163–186. <https://doi.org/10.1093/joc/jqab006>



Fryer, M. (2016). *Influence of the internet on children's vaccination : applying intercultural theories to analyze parental decision-making* (Publication NO. 10154884) [Master's thesis, Royal Roads University]. ProQuest

Gagneur, A. (2020) Motivational interviewing: A powerful tool to address vaccine hesitancy. *Can Commun Dis Rep* 2020, 46(4), 93–97. <https://doi.org/10.14745/ccdr.v46i04a06>

Gagnon, D., Beauchamp, F., Bergeron, A., Dubé, E. (2023, March 23). *Vaccine hesitancy in parents: how can we help?* CANVax. <https://canvax.ca/brief/vaccine-hesitancy-parents-how-can-we-help>

Goldstein, S., MacDonald, N. E., & Guirguis, S. (2015). Health communication and vaccine hesitancy. *Vaccine*, 33(34), 4212–4214. <https://doi.org/10.1016/j.vaccine.2015.04.042>

Government of British Columbia. (2021, June 9). *Regional health authorities*. <https://www2.gov.bc.ca/gov/content/health/about-bc-s-health-care-system/partners/health-authorities/regional-health-authorities>

Government of British Columbia. (2022). *Family Doctors and Other Primary Care Providers*. <https://www2.gov.bc.ca/gov/content/family-social-supports/seniors/health-safety/health-care-programs-and-services/family-doctors-and-other-primary-care-providers>

Habersaat, K., MacDonald, N. E., Dubé, E. (2021). Designing tailored interventions to address barriers to vaccination. *Canada Communicable Disease Report*, 47(3), 165–165. <https://doi.org/10.14745/ccdr.v47i03a07>

Hornsey, M. J., Finlayson, M., Chatwood, G., & Begeny, C. T. (2020). Donald trump and vaccination: the effect of political identity, conspiracist ideation and presidential tweets on vaccine hesitancy. *Journal of Experimental Social Psychology, 88*.  
<https://doi.org/10.1016/j.jesp.2019.103947>

ImmunizeBC. (2020, March 19). *What are vaccines?* <https://immunizebc.ca/what-are-vaccines>

ImmunizeBC. (2021, June). *BC Routine Immunization Schedule Infants & Children*.

[https://immunizebc.ca/sites/default/files/docs/vaccine-schedule-infants-children-2021-v02\\_2.pdf](https://immunizebc.ca/sites/default/files/docs/vaccine-schedule-infants-children-2021-v02_2.pdf)

Krishna, A. (2018). Poison or prevention? Understanding the linkages between vaccine-negative individuals' knowledge deficiency, motivations, and active communication behaviors. *Health Communication, 33*(9), 1088–1096.  
<https://doi.org/10.1080/10410236.2017.1331307>

Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M. D., & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007-2012. *Vaccine, 32*(19), 2150–2159. <https://doi.org/10.1016/j.vaccine.2014.01.081>

Life Literacy Canada. (2022). *What is health literacy?* <https://abclifeliteracy.ca/health-literacy/>

MacDonald, N. E. (2015). Vaccine hesitancy: definition, scope and determinants. *Vaccine, 33*(34), 4161–4164. <https://doi.org/10.1016/j.vaccine.2015.04.036>

May, T. (2020). Anti-vaxxers, politicization of science, and the need for trust in pandemic response. *Journal of Health Communication, 25*(10), 761-763.  
<https://www.tandfonline.com/doi/full/10.1080/10810730.2020.1864519>

- McGregor, S., & Goldman, R. D. (2021). Determinants of parental vaccine hesitancy. *Canadian Family Physician, 67*(5), 339–339. <https://doi.org/10.46747/cfp.6705339>
- Merrigan, G., Huston, C.L., & Johnston, R. (2012). *Communication Research Methods* (Canadian ed.) Don Mills, Canada: Oxford University Press.
- Michie, S., Atkins, L., & West, R. (2014). *The Behaviour Change Wheel: A Guide to Designing Interventions*. Silverback Publishing.
- Northern Health Authority. (2016). *Chief Medical Health Officer's Child Health Report*. [https://www.northernhealth.ca/sites/northern\\_health/files/about-us/reports/chief-mho-reports/documents/northern-health-CMHO.pdf](https://www.northernhealth.ca/sites/northern_health/files/about-us/reports/chief-mho-reports/documents/northern-health-CMHO.pdf)
- Northern Health Authority. (2020, July). *2020/21 – 2022/23 Service Plan*. [https://www.northernhealth.ca/sites/northern\\_health/files/about-us/reports/strategic-service-plans/documents/service-plan-2021-2023.pdf](https://www.northernhealth.ca/sites/northern_health/files/about-us/reports/strategic-service-plans/documents/service-plan-2021-2023.pdf)
- Northern Health Authority. (n.d.). *Quick facts*. <https://www.northernhealth.ca/about-us/quick-facts>
- Nuwarda, R.F., Ramzan, I., Weekes, L., Kayser, V. (2022). Vaccine Hesitancy: Contemporary Issues and Historical Background. *Vaccines, 2022*(10),1595. <https://doi.org/10.3390/vaccines10101595>
- Pan American Health Organization (2020, April 30). *Understanding the infodemic and misinformation in the fight against COVID-19*. <https://www.paho.org/en/documents/understanding-infodemic-and-misinformation-fight-against-covid-19>

- Public Health Agency of Canada. (2022a, February 7). *Highlights from the 2019 childhood National Immunization Coverage Survey (cNICS)*. <https://www.canada.ca/en/public-health/services/publications/vaccines-immunization/2019-highlights-childhood-national-immunization-coverage-survey.html>
- Public Health Agency of Canada. (2022b, March). *Vaccine Hesitancy in Canadian Parents*. <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/healthy-living/vaccine-hesitancy-canadian-parents/vaccine-hesitancy-canadian-parents.pdf>
- Royal Society for Public Health. (2019, January). *Moving the needle: promoting vaccination uptake across the life course*. <https://www.rsph.org.uk/static/uploaded/3b82db00-a7ef-494c-85451e78ce18a779.pdf>
- Schellenberg, N., & Crizzle, A. M. (2020). Vaccine hesitancy among parents of preschoolers in Canada: a systematic literature review. *Canadian Journal of Public Health, 111*(4), 562-584. <http://dx.doi.org/10.17269/s41997-020-00390-7>
- Skinner, C. S., Tiro, J., & Champion, V. L. (2015). Background on the health belief model. *Health behavior: Theory, research, and practice, 75*, 1-34.
- Sondagar, C., Xu, R., MacDonald, N. E., & Dubé, E. (2020). Vaccine acceptance: How to build and maintain trust in immunization. *Canada Communicable Disease Report, 46*(5), 155-159. <http://dx.doi.org/10.14745/ccdr.v46i05a09>
- Statistics Canada. (2021, May 3). *Childhood National Immunization Coverage Survey, 2019*. <https://www150.statcan.gc.ca/n1/daily-quotidien/210503/dq210503b-eng.htm>

- Thomson, A., Vallée-Tourangeau, G., & Suggs, L. S. (2018). Strategies to increase vaccine acceptance and uptake: from behavioral insights to context-specific, culturally-appropriate, evidence-based communications and interventions. *Vaccine*, 36(44), 6457–6458. <https://doi.org/10.1016/j.vaccine.2018.08.031>
- Twitter. (2021, January 8). *Permanent suspension of @realDonaldTrump*. [https://blog.twitter.com/en\\_us/topics/company/2020/suspension](https://blog.twitter.com/en_us/topics/company/2020/suspension)
- Unicef. (n.d.). *Vaccine messaging guide: evidence-based guidance for fostering demand for immunization through social and behaviour change communications*. <https://www.unicef.org/media/138031/file/Vaccine%20Messaging%20Guide.pdf>
- Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science*, 359(6380), 1146-1151. <https://www.science.org/doi/10.1126/science.aap9559>
- World Health Organization. (2014, November 12). *Report of the SAGE working group on vaccine hesitancy*. [https://www.who.int/immunization/sage/meetings/2014/october/1\\_Report\\_WORKING\\_GROUP\\_vaccine\\_hesitancy\\_final.pdf](https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf)
- World Health Organization. (2019a, January 10). *Ten threats to global health in 2019*. <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>
- World Health Organization. (2019b). *TIP Tailoring Immunization Programmes*. <https://apps.who.int/iris/bitstream/handle/10665/329448/9789289054492-eng.pdf>

World Health Organization. (2022). *Behavioural and social drivers of vaccination: Tools and practical guidance for achieving high uptake.*

<https://apps.who.int/iris/bitstream/handle/10665/354459/9789240049680-eng.pdf?sequence=1&isAllowed=y>

**Appendix A: Sample Social Media Communication to Recruit Parent Participants****Sample text posted with graphic:**

Research opportunity! Are you a parent or guardian of a young child (0-5 years)? Do you live in the Northern BC region? Have you ever felt unsure about or questioned vaccines for your child? Share your experience with researchers during a 30-60 min interview. Interested participants are invited to contact [haylee.seiter@royalroads.ca](mailto:haylee.seiter@royalroads.ca).

**Questions about**  
*Vaccines for your child?*

**Share your experience!**

Please apply if you are:

- ✓ A parent or guardian of a young child (0-5 years)
- ✓ A Northern BC resident for the past three years

**CONTACT**  
[haylee.seiter@royalroads.ca](mailto:haylee.seiter@royalroads.ca)

**Royal Roads**  
UNIVERSITY

## **Appendix B: Interview Questions**

### **PARENT recruitment screening questions**

1. Do you live in the Northern BC region? Y/N
2. Do you have one or more children between 2 months to 5 years of age? Y/N

### **PARENT interview questions**

1. Before we dive in, please help me get a picture of who you are as an individual. Tell me about yourself and your family.  
  
(Prompts: how many children live in your household and what are their ages, what is your occupation, what is your education, what community are you based in, what year were you born).
2. The purpose of this study is to get a better understanding of why parents in Northern BC may be concerned about vaccines. Sharing your opinions, attitudes, and experiences will give researchers valuable insights. To start us off, can you please describe your feelings towards vaccinations? Why do you think you feel like that?
3. Were your feelings and attitudes on vaccines different before the COVID-19 pandemic?
4. I'd like to now focus on your family and your children. When considering vaccination for your children, did you ever delay or decide not to get a shot for reasons other than illness or allergy? Can you tell me more about this? If you did not delay or refuse, can you please tell me why?
5. Next (or finally, if anti-vaxxer), let's talk about your process of looking into vaccines. When looking for information on vaccines, where do you go? Is there someone in your life you speak to about vaccines when you have questions?



6. To continue on the topic of the previous question, when looking into vaccines, how did you consider risk for your child? On one hand, there is risk of a child potentially experiencing vaccine side effects, and on the other hand there is the potential for the child to experience serious illness or death from a disease that could be prevented with a vaccine. Is one of these risks more important to you than the other? Please explain.
7. Next, I'd like to ask you about your experience as a parent. Have you ever faced any barriers or challenges getting your children vaccinated? Please describe them.
8. We are almost at our final question. In your opinion, what would help parents make informed choices about vaccines? Is there anything health care providers or health authorities could do to help parents make informed choices on vaccines? Is there a different or better way to communicate about vaccines to parents?
9. Lastly, are there any questions I should ask you, but didn't? Please tell me the question and how you would like to answer it.

**IMMUNIZER pre-interview questions**

1. What community do you live and work in? Free text
2. What is your position? Free text
3. Have you immunized young children (2 months to 5 years)? For how long?

**IMMUNIZER interview questions**

1. To start, please tell me about yourself and your experience with routine childhood immunizations for young children (2 months to 4 years) in your community.
2. Vaccine hesitancy is described as a scale. On one end there is vaccine acceptance and on the other end there is vaccine refusal and everything between the two poles. Overall,

where would the parents and families you work with in your community, land on that scale? 0 being vaccine refusal and 10 being vaccine acceptance. Tell me more.

3. Have you worked with parents who delayed or refused vaccination for reasons other than allergy or illness? Why do you think they delayed and/or refused?
4. Thinking about the parents you work with, do you think their vaccine views were different before the COVID-19 pandemic? What would you say the impact of COVID-19 has been on routine childhood immunizations?
5. For the parents you work with, what would you say is their main source of information for vaccines?
6. In your opinion, what are barriers for families to get their young children (2 months to 5 years) vaccinated?
7. In your opinion, is there anything health care providers or the health authority could do to help parents make informed choices on vaccines? Is there a different or better way we could communicate about vaccines to parents?
8. Lastly, are there any questions I should ask you, but didn't? Please tell me the question and how you would like to answer it.