Reverse vaccine hesitancy: a qualitative study assessing factors that drive COVID-19 vaccine acceptance on Vashon Island, WA

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Abstract

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Background

Vaccine hesitancy remains a major threat to controlling the ongoing COVID-19 pandemic. Vashon Island, WA has historically been defined as a vaccine hesitant community yet has one of the highest COVID-19 uptake rates in the state. This study aimed to understand views of parents who were previously hesitant towards childhood vaccines yet were receptive to receiving the COVID-19 vaccine, a concept defined as "reverse vaccine hesitancy".

Methods

In-depth interviews were conducted with 12 Vashon parents. A mix of purposive and snowball sampling were used to recruit participants. Interviews were recorded and transcribed verbatim. A rapid qualitative data analysis approach was used to identify key findings along the constructs of the Theory of Planned Behavior.

Results

Four key factors that impacted participants' decision to receive the COVID-19 uptake were identified, namely trust in the vaccine's efficacy and safety, a sense of altruism regarding wanting to protect their community from getting the virus, positive peer pressure, as well as the removal of structural barriers that improved vaccine accessibility.

Conclusion

Vaccine hesitancy is a complex issue and thus, requires a multifaceted strategy. Key recommendations for improving vaccine uptake rates in hesitant setting include framing vaccine acceptance as a social norm as well as developing accurate and transparent vaccine messages using trusted information sources. Future research is needed to continue to understand this phenomenon to further develop effective vaccination campaigns to not only end the pandemic but also improve vaccine efforts for other diseases.

Introduction

Vaccines are one of the most outstanding public health achievements in the history of humankind, averting millions of deaths while saving nearly $70 billion in health costs in the United States (1). The ongoing COVID-19 pandemic has been a glaring reminder of the critical role that vaccines play in preventing and reducing the spread of disease. For many, the COVID-19 vaccine was a potential opportunity for life to return to "normal". However, from the moment of its release, public conversation centered around the hesitancy citizens felt toward the vaccine, impacting its ability to rapidly help end the pandemic.

The World Health Organization (WHO) defines vaccine hesitancy as the reluctance or refusal to vaccinate despite the availability of vaccines, and has identified it as one of the top 10 threats to global health in 2019 (2). Vaccine hesitancy is often deemed as an issue of individual choice and responsibility, despite its implication at the community and society levels – if hesitancy persists, communities will not be able to reach the necessary coverage rates to achieve herd immunity (3). Recent systematic reviews have identified key characteristics that influenced COVID-19 vaccination decision-making including: age; race/ethnicity; gender; income; level of completed education; as well as religious or political affiliation (4,5). The most prominent reasons for refusal include being against vaccines in general, lack of trust in the vaccine's safety and efficacy, concerns about the development process (i.e., perceiving that it was produced too quickly), and feeling that COVID-19 was not as harmful as advertised (3–5).

In the United States, vaccine hesitancy remains a critical issue for the ongoing COVID-19 pandemic, as national vaccine acceptance rates were recently as low as 57% (6). Among a national survey assessing COVID-19 vaccine intentions amongst nearly 3,000 adults, only one-third of unvaccinated respondents reported a strong intention to receive the vaccine within the next year of

its availability (7). Interestingly, in this study, along with the aforementioned vaccination factors, the authors highlighted that previous influenza vaccination was also associated with COVID? vaccine uptake (7), suggesting that there may be a relationship between previous vaccination experience and current vaccination decision. Thus, linking prior and current vaccination decision may help better understand this complex phenomenon.

Hesitancy is also a major issue for childhood vaccinations, despite the legislation of school entry immunization requirements in all states and the District of Columbia (8). Under these laws, children entering kindergarten are mandated to be vaccinated against certain communicable diseases as a condition for school attendance, namely DTaP (diphtheria, tetanus toxoids, and acellular pertussis), polio (poliovirus), chickenpox (varicella), MMR (measles, mumps, & rubella), Hep B (hepatitis B), Hep A (hepatitis A), Hib (Haemophilus influenzae type b), and PCV (pneumococcal conjugate) (9). Recent national vaccination coverage studies demonstrate that amongst children born in 2017 and 2018, only 70% completed the recommended series by age 24 months (10), substantially below the 80% target set by *Healthy People 2020* (11). Parental vaccine hesitancy is indicated by parents forgoing or delaying receipt of recommended vaccines for their children and contributes up to 25% of pediatric under-vaccination among children aged 19-35 months (12). Key factors that contribute to parental vaccine hesitancy include perceptions around vaccine safety and effectiveness, distrust in healthcare systems, as well as individual factors such as educational attainment, income, and belonging to racialized or minoritized identity group (13,14). Interestingly, these factors heavily overlap with factors identified within the COVID-19 vaccine hesitancy evidence base.

Parental vaccine hesitancy has been found to be associated with lower coverage of childhood vaccines in several under-vaccinated communities across the United States, including

Vashon Island, a small community located in King County, Washington (12). Historically, Vashon has one of the lowest pediatric vaccinations rates in the United States. For the 2018-19 school year, Vashon childhood vaccination coverage among kindergarteners was 74%, compared to 86% in the state overall (15). An increasing number of Vashon parents have cited distinct reasons for their refusal, including misinformation, perceptions of minimal risk, as well as religious or philosophical beliefs such as personal freedom and individualism. Historically, in the United States, parental vaccine hesitancy has been driven my misinformation or misinterpretation regarding the safety of vaccines. For example, the MMR vaccine was inaccurately linked to autism in children, which led to a massive reduction in MMR vaccination rates nationally (8,16–18).

Despite the low rates of pediatric vaccinations in Vashon, data from Public Health - Seattle and King County show that 92.6% of Vashon residents, age 5+ years old, have completed their COVID-19 vaccination series, which is the highest rate in King County (19). Although several news sources (20,21) have discussed the phenomenon of "reverse vaccine hesitancy" on the island, to our knowledge, no studies have examined the factors that have led to the high acceptance and uptake of the COVID-19 vaccine amongst this population. Thus, the purpose of this qualitative study was to understand reverse vaccine hesitancy amongst the unique population of Vashon Island. Specifically, our primary aim was to understand the views of Vashon Island parents who accepted the COVID-19 vaccine for themselves but refused or delayed routine childhood immunizations for their children.

Methods

Study context

Vashon Island is the largest island in the Puget Sound in the Pacific Northwest, home to approximately 10,000 residents as per the most recent census (22). Located within King County,

Washington, the island is a mere 20-minute ferry ride from Seattle and is known to have a close-knit community where residents know each other by first name. There are five public schools in the Vashon Island School District (VISD), with total enrollment of 1,541 students, according to 2021-2022 VISD data (23). Media coverage often centers around Vashon's reputation as a vaccine hesitant region; however, Vashon is a popular tourist destination within the Seattle and Pacific Northwest regions due to its beautiful landscape and quaint island lifestyle.

Participants recruitment

Participant recruitment involved close collaboration with Vashon local organizations, including VashonBePrepared – a coalition of local disaster preparedness organizations, Vashon Youth and Family Services, Vashon Medical Reserve Corps, and Vashon Pharmacy. Prior to study initiation, the primary researcher conducted informational interviews with key stakeholders involved in the pandemic response on the island. These interviews provided necessary contextual and historical background about Vashon, as well as provided key advice regarding community engagement strategies elicited from lessons learned from their role leading the COVID-19 campaigns on Vashon. In addition, key informants within Public Health - Seattle and King County provided contact information of local data managers working on reporting vaccination rates on the island. Collectively, this contextual information provided a clear strategy for how best to engage with Vashon community members, a better understanding of its historical context, and clarity regarding the vaccination uptake on the island. Study information flyers were then created, detailing the research and researcher contact information. The flyers were used during community outreach and canvassing activities to recruit participants at popular local access points, including the farmer's market, restaurants, shops, and the pharmacy community bulletin board. Throughout the study period, these relationships were sustained by periodic phone calls, emails, and text

messages to provide updates regarding recruitment and informing them about the study's progress – all of which were critical for study success and ensuring local ownership of the research process.

Sampling strategy

For the purposes of the study, hesitancy was defined as either delayed or refused childhood vaccinations. Participants were recruited using purposive sampling with the following criteria:

1. Self-identify as Vashon Island resident
2. Be at least 18 years of age and self-identify as parent or caregiver
3. Self-identify as vaccine hesitant towards any childhood vaccine (i.e., either refused or delayed any recommended childhood vaccine)
4. Have received at least one dose of the COVID-19 vaccine

All potential participants were initially screened to ensure that they met these criteria before initiating interviews. Additionally, snowball sampling was used during data collection to identify other eligible individuals who might be interested in participating in our study. Some individuals proactively contacted the primary researcher to be involved in the study after receiving the study flyers, while others were reached through snowball sampling techniques (24). We anticipated that our population of interest would be hard to reach due to the sensitive nature of our study, thus this snowball sampling was highly effective at identifying individuals to participate in the interviews. Methodologically, snowball sampling is considered a valuable tool for the study of particularly sensitive and private issues (25,26). At the end of each interview, participants were asked if they knew of other community members who met the study criteria that they could refer to also participate in the study. These participants served as community "gatekeepers", who are in the position to facilitate contact between the researcher and potential respondents (27). Initially, two respondents met the study criteria and served as gatekeepers; through their referrals, we were able

to achieve our full sample size. Given the proactive sampling strategy, all potential participants accepted to be interviewed.

Data collection & conceptual framework

An interview guide (Appendix 1) was developed, guided by the Theory of Planned Behavior (TBP, *Figure 1*), which posits that an individual's health behavior is determined by three key constructs – attitude (perception towards the behavior), subjective norm (social pressure to perform the behavior), and perceived behavioral control (structural factors that impact the ease or difficulty of performing the behavior) (28). TPB has been widely used in various studies investigating determinants of COVID-19 vaccination intentions in adults across various high- and low-and-middle-income countries – namely to predict vaccination intentions and to develop targeted interventions aimed at increasing vaccine uptake (28–31). Collectively, these studies demonstrate the utility of using TBP to better understand the phenomenon of COVID-19 vaccine hesitancy and uptake.

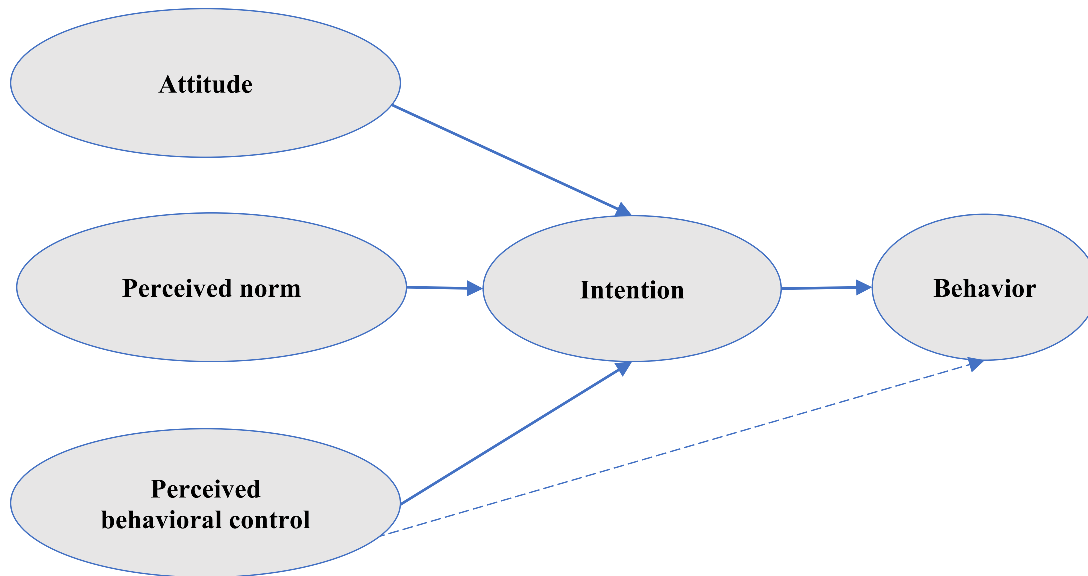

Figure 1: Theory of Planned Behavior

In-depth interviews were conducted by the primary researcher TOL via a secure passcode-protected Zoom portal (32), which lasted approximately one hour and were audio recorded with participant consent. Interviews were scheduled based on participant availability via telephone or email. The live transcript option was turned on during the Zoom interviews and transcripts were saved immediately after the interviews concluded. Audio recordings were transcribed verbatim by TOL using Otter.ai (33) and cross-checked against the Zoom transcripts to ensure accuracy of transcription.

Data analysis

Data were analyzed using the rigorous and accelerated data reduction (RADaR) technique, a rapid analytical method that has been widely used for qualitative data analysis (34). This technique involves using a data reduction approach that produce concise data analysis tables.

Details of the analytical steps have been detailed elsewhere and were followed for this study (34). Preliminary analytical steps to better understand the respondents' perspective from a holistic viewpoint were undertaken, including reviewing field notes, listening to interview audio-recordings, and reading verbatim transcripts. Subsequently, responses to each interview guide question (i.e., raw data) were included in a Microsoft Excel spreadsheet in a table format to consolidate and integrate the transcribed data. Throughout this process, the interview guide and participant responses were continuously revisited to familiarize the researcher with the data, ensure that relevancy of included data, and develop initial groupings of key findings. All data reduction processes followed a deductive approach, guided by TBP, in order to ensure that results aligned with the theoretical constructs. A more concise data table was then created by further reducing the raw data where full responses that directly aligned with the research question and intended TBP domain were extracted. This was further refined into succinct quotes for inclusion into the analytical report. This reduced data table summarized the key findings along the domains of the TBP.

Results of this analysis are presented in a narrative summary of key findings, with embedded representative quotes that underwent minor grammatical alterations to improve readability.

Ethical Considerations

Ethical approval was obtained from the University of Washington Institutional Review Board (Reference STUDY00015224). Informed consent was obtained verbally from all participants who were interviewed. Participants were offered the choice to turn off their camera if they did not want to be visually seen and were informed of their rights to skip any questions or opt out participating in the study should they feel any discomfort during the interview process.

Participants were not compensated for their time due to limited study resources; however, they were informed about a planned community dissemination event sponsored by a local restaurant that they could attend anonymously. All individuals who were contacted using snowball sampling proactively contacted the researcher, thus their personal information was not provided directly to the principal investigator. During transcription, participant names were replaced with alphanumeric unique identifiers to ensure anonymity and confidentiality. Any other identifiable information was also redacted from all transcripts. Interviews were saved in a password-protected online folder and only accessible to the principal investigator TOL.

Results

Characteristics of study participants

A total of 12 participants were interviewed as part of this study (*Table 1*). Nearly all respondents (92%, n=11) indicated that they delayed their children's vaccinations, while only one individual refused the recommended vaccinations. Most respondents were long-time Vashon residents with an average time of 14 years on the island, female (67%) with a median age of 49 years.

Table 1. *Characteristics of study participants.*

Characteristics	Number of Participants (N=12)	Proportion of sample
Years spent living on Vashon		
1-10 years	4	33%
10-20 years	2	17%
20-30 years	6	50%
Age group		
30-39 years old	2	17%
40-49 years old	5	42%
50-59 years old	4	33%
60-69 years old	1	8%
Race/ethnicity		
Caucasian	10	83%
Native American	1	8%
Asian American	1	8%
Gender		
Female	8	67%
Male	4	33%
Highest level of education		
Professional degree	1	8%
Community college	1	8%
Bachelor's degree	4	33%
Master's degree	5	42%
Doctorate	1	8%

Below, we present our key findings along the three constructs of TPB.

<u>Attitude towards the behavior</u>

Our first set of findings connect to the TBP construct "attitude towards the behavior" i.e., COVID-19 vaccine uptake, demonstrating how positive attitude directly influences vaccine uptake by increasing trust in the vaccine and encouraging participants to vaccinate as a means to protect their community from the virus.

Finding 1: Participants held a positive attitude towards the COVID-19 vaccine due to an increased level of trust

Trust was an important, yet multidimensional factor that played a significant role in participants' decision to receive the vaccine. Most participants reported being eager to get the

COVID-19 vaccine because they trusted the vaccine development process, namely because they felt confident that they understood the science behind its development was innovative yet building upon prior research.

> *I know that the vaccine is basically similar technology to a lot of the vaccines that exist. So, it's not my understanding that it's not a brand-new process. But that obviously it's approaching something different. Because COVID is new, but the vaccine process is not so different. So, I have some trust in that historical piece.* – Participant 3, Female, 38 years-old

> *Also understanding that that RNA vaccine technology had been in development for a long time, and that was why the COVID vaccine itself could be so quickly developed. And knowing that, you know, looking at data, you know, like this, the testing was done on, you know, many thousands of people.* – Participant 10, Female, 44 years-old

They linked their confidence regarding the development process to an increased confidence in the vaccine's efficacy and a better understanding of their risk perception that was made clear by the Medical Reserve Corps. Some participants mentioned that getting the vaccine came with certain risks; however, they believed that the benefits of getting the vaccine outweighed the risks of contracting the virus.

> *It's new. Nobody knows much about it. So that was where it made sense to me to run the risk of having a reaction to the COVID-19 vaccine. That felt like a lesser risk than contracting COVID. And not knowing what was going to happen after that, because we still don't know what's going to happen.* – Participant 4, Female, 38 years-old

> *So, I was really curious to learn more about the mRNA development. And through that felt like the risks were really low, the effectiveness was high, that getting boosters going forward was something that I was accepting of… I felt like the MRC (Medical Reserve Corps) was able to translate the broader information to something that really connected directly with our local experience in our local needs at that time.* – Participant 7, Male, 50 years-old

> *I think it's safe and effective. I think nothing is perfect.* – Participant 9, Female, 55 years-old

Finding 2: Participants felt an obligation to protect their community members from the virus

In addition to trust, positive attitude towards the vaccine was indicated via feeling a sense of obligation to the greater good and protecting vulnerable community members from getting

COVID-19. Respondents felt it was their duty to protect their entire community and believed that in receiving the vaccine, they were doing their part towards making a collective difference in helping keep the community safe from the pandemic.

> *I felt like there was a real important moment of public health responsibility for us all to care for each other, and that I was really looking for something tangible that I could do, that made a difference to the community.* – Participant 7, Male, 50 years-old

> *I was not necessarily worried that if I personally got COVID, that I would end up in the hospital… I'm willing to sacrifice to take the risk of an experimental vaccine to contribute to protecting my community.* – Participant 1, Female, 49 years-old

Subjective norms

Our second group of findings connect to the TBP construct "subjective norms" i.e., perceived social pressure to vaccinate, demonstrating how peer vaccination norms influenced vaccination amongst respondents by framing their vaccination decision against the actions of their community members via reported coverage rates. Additionally, these norms elicited a feeling of not wanting to be shunned by their community members and their desire to socialize with their neighbors.

Finding 3: Positive peer pressure and social norms prompted participants to receive the COVID-19 vaccine

Most participants reported that positive peer pressure played a role in their decision to vaccinate. They indicated multiple sources of information to stay informed about ongoing developments of the pandemic, including information about vaccine uptake rates. Named sources included national and local mass media outlets, Washington State and King County public health data dashboards, as well as trusted local medical professionals. These sources not only discussed the importance of getting vaccinated, but continuously provided data demonstrating the increasing

vaccination rates, thus integrating a subjective norm that everyone else within their wider and immediate community was getting vaccinated.

> *Our local newspaper, the Vashon Beachcomber did a good job at covering the story as it was happening. Outside of that, I had direct sources of information from my friends in the medical profession [that were] highly influential. And then from sort of a general news perspective and NPR, local public radio and in podcasts I think I have a pretty good sense or intuition about when information is legitimate and when information is unreliable.* – Participant 7, Male, 50 years-old

> *When I was tracking severity of COVID, the way that I made my assessment was not by case rates, but by hospitalization and death rates…one of the ones I looked at a lot was the King County Hospital Association website…I looked at hospitalization rates in the local hospitals to see whether it was going up. And then I looked at…the King County Public Health Dashboard… that helped me assess the risk and therefore assess whether or not I would get vaccinated…I also have a lot of friends who are physicians, and or nurses…so that influenced me for sure. Talking to people on their front lines. Of course, I mean, the news. Like everybody, we're all glued to the news during that time trying to get a grip trying to get trying to understand this pandemic…I tried to find as many sources as possible about it so that I felt comfortable with my decisions… not just vaccination, but my decision, whether I stay home, whether I see friends.* – Participant 1, Female, 49 years-old

Respondents also indicated this sense of peer pressure that elicited a feeling of not wanting to be ostracized or engaging with their community members or being questioned about their vaccination status. For example, respondents mentioned how their need for social engagement was impacted by public outing vaccine mandates, either in official establishments such as restaurants or from rules set by their neighbors to participate in community gatherings and celebrations. Given the close nature of the island community, this perceived pressure was especially prominent for many respondents.

> *If I'm being honest, I didn't want to be one of the people that didn't have the vaccine, like I didn't, there was there was some peer pressure at play there…Historically, I didn't vaccinate my children. I'm probably not current on my vaccines myself. But that's not something that I ever had to discuss or disclose to anyone really… [before COVID] I wasn't being turned away from restaurants because my kids didn't have a current TDap. I wasn't being told you can only attend birthday parties, if you have your MMR."* – Participant 4, Female, 38 years-old

> *[Vashon], it's small…I see my neighbors on walks every single day and I bump into the same people at the grocery store …it feels intimate and close, it feels like the type of place that someone would walk up to you and ask, are you vaccinated* – Participant 2, Female, 58 years-old

Perceived behavioral control

Our last group of findings connect to the TBP construct "perceived behavioral control" i.e., ease or difficulty of vaccination, illustrating how structural barriers play a critical role in vaccine decision-making. To mitigate these barriers, local pandemic response organizations made it drastically easier for community members to vaccinate by improving the accessibility of vaccines.

Finding 4: Local health organizations reduced structural barriers to getting the COVID-19 vaccine

Most participants emphasized the easiness of getting the vaccine on the island as one of the key factors that led them to get vaccinated. They mentioned how local organizations and volunteers coordinated the COVID response to reach every eligible member in the community, removing structural barriers such as registration bottlenecks and long transportation times. Respondents felt a sense of pride and gratefulness for the local organizations and community members that made the process simple and straightforward.

> *Vashon did a great job. It was really great. And everybody was really proud of it… I signed up online, and I showed up, locked in. And it was a great setup. I was very impressed… our pharmacy, [redacted] the owner of our pharmacy, he's incredible. The whole community loves him. I mean, he's like a hero here. He set up a system. You know, you go online, you register. And then they have the lines of cars, and the movie theater let the pharmacy use their parking lot… And, everybody got vaccinated there…so structures like the setup [we had] was fabulous.* – Participant 1, Female, 49 years-old

> *Not having to take a ferry to go get a vaccine was really nice. I think if it had been a situation where we had to leave the island, that would have been a little bit more prohibitive, but for instance, when my husband and I went to go get our shots, our 16-year-old stayed at home with the younger three. So, if we had to take all of them off Island to go get shots, it would have been a little bit of a hassle, especially during a time when we weren't leaving the island, because we were quarantining and trying to stay safe and keep others safe. So, we were really, really minimizing leaving our home. So, we got our vaccines at the CMR clinic. And*

it was very convenient… we made an appointment, went up there, got our vaccines, sat for 15 minutes to make sure no side effects and came home. And then they had already scheduled us for our booster shot. And then when it was time for our second dose… and booster shot, same thing, it was very convenient. And not having to leave the island was huge. – Participant 4, Female, 38 years-old

Discussion

Our findings illustrate how positive attitude towards vaccination, peer norms, and elimination of structural barriers led previously vaccine hesitant parents to convey a sense of "reverse hesitancy" for the COVID-19 vaccine. Positive attitude led to increased trust towards the vaccine and altruistic intentions to protect the community. Peer vaccination norms signaled a perceived normalization of and preference towards vaccination amongst community members. Lastly, the removal of structural barriers such as registration and vaccination logistics made it fairly effortless for residents to receive the vaccine. These findings are in accordance with a recent systematic review detailing the individual, interpersonal, and contextual factors associated with COVID-19 vaccine hesitancy (4).

Within the growing research of COVID-19 vaccine hesitancy, two key themes stand out – firstly, the factors associated with hesitancy for COVID-19 are not much different than those for other vaccines. As indicated by the 5C Model of Vaccine Hesitancy (35), these factors are grouped as five key determinants of hesitancy: confidence, complacency, convenience, calculation, and collective responsibility. Confidence signifies the trust in vaccine safety and effectiveness, complacency occurs when perceived risk of disease, convenience denotes the structural or psychological barriers to vaccine uptake, calculation defines intentional engagement in information searching to compare risks of infection vs. vaccination, and collective responsibility refers to the willingness to protect others by being vaccinated. These factors are all observed in our key findings – trust (i.e. confidence), information seeking (i.e. calculation), and structural

barriers (i.e. convenience) have been widely studied as key vaccination factors; however, the evidence base for social norms (i.e. collective responsibility) is still growing within the context of the COVID-19 vaccine, with few studies illustrating their impact on vaccine uptake (36–38). A 2020 study indicated that peer norms were defined as distinct predictors of vaccine uptake, especially amongst adolescents (39) – a key target group for vaccination efforts given the recent release of pediatric vaccination recommendations. In another 2021 study, authors concluded that discouragement towards vaccination by family friends was an independent predictor of lower vaccine uptake (40). These findings demonstrate the dominant role social norms play in the current pandemic, as some protective behaviors are more visible (e.g., wearing masks or physical distancing) and contribute to the evidence base by further highlighting the importance of social norms as a tool to reverse vaccine hesitancy during the ongoing pandemic.

Taken together, these findings can inform strategies for policy makers and implementers to address vaccine hesitancy in communities like Vashon Island. We propose the following recommendations that are in line with the Sabin-Aspen Vaccine Science Group agenda to meet the challenge of vaccination hesitancy (41) and the National Institutes of Health COVID-19 vaccination communication strategies (42) to increase COVID-19 vaccine uptake amongst vaccine hesitant communities:

1. *Frame vaccine acceptance as a social norm*

Utilizing the power of positive peer pressure can enhance vaccination behavior by increasing a sense of social responsibility, as individuals may be more likely to vaccinate if they perceive a greater risk for others within their immediate community – even more so than their own individual risk (36,43,44). Given that perceived self-risk is often not a key indicator for vaccination, public health messaging should focus on motivating individuals to vaccinate in order

to protect their community (43). Appealing to altruism and prosocial behavior is listed as an evidence-based recommendation to mitigate COVID-19 vaccine hesitancy (43).

However, this strategy may not be as simple as messaging to vaccinate for the greater good. A recent commentary discussing the key drivers of COVID-19 vaccine hesitancy discussed the implication of context and its importance on vaccine decision (45). The authors note how many parents in high income settings tend to hold an individualized worldview that "health is individualized" and thus, decisions related to health risks and any mitigation strategies are matters of individual choice. This perspective may conflict with current vaccination promotion efforts that emphasize social norms as key drivers of behavioral change; thus, careful navigation is needed in developing messages that respect individual autonomy while promoting collective responsibility. Recent research discusses the utility of using behavioral economics to counter innate cognitive biases, advising policymakers and public health practitioners how to carefully and strategically emphasize prosocial reasoning for receiving the vaccine (46). The authors note that "framing decisions in terms of their impact on others may also reduce people's tendency to rationalize their refusal of the vaccine as individuals are less likely to make self-interested decisions when faced with uncertainty about the extent that their decision will negatively impact other people" (47). They provide sample messaging for health communication campaigns such as "You could spread COVID-19 to your older family member/friend, and you don't know how badly it may affect them"(46).

2. *Create accurate and transparent vaccine messages*

An interesting finding from respondents was the utility of local pandemic response organizations in translating complex public health information into tailored communication products that aligned with key community perspectives. This strategy is especially important for

mitigating misinformation or misperceptions regarding the vaccine, which can be achieved by framing messages in ways that affirm – not negate or judge – personal values (43,48).

3. *Utilize trusted source of information for effective community engagement strategies*

Trust remains a key, multidimensional factor for vaccine confidence and subsequent uptake – namely trust in vaccine safety and efficacy, trust in health care delivery systems, and trust in policymakers developing vaccination recommendations (43). Thus, trust must also be at the center of the information sources used to mobilize individuals to vaccinate themselves, or to recommend others within their community to vaccinate. Recent assessments of communication strategies aimed at mitigating COVID-19 vaccine hesitancy emphasized the importance of trust in information source to enhance the persuasiveness of health communication campaigns (49,50).

For the last two findings, a new contextual element that differs the current pandemic from previous ones is the social media age that has drastically increased the speed of global information exchange, potentially leading to "viral sharing of fringe opinions" and misinformation (3). This perspective was emphasized by the World Health Organization (WHO) Director-General in February 2020, when he stated "We're not just fighting an epidemic; we're fighting an infodemic" (51). In this sense, not only is the virus spreading, but vaccine hesitancy is also becoming contagious. Thus, vaccination campaigns should consider how social media impacts individual decision and develop strategies that consider the information algorithms and not just solely focus on the messaging alone (52).

Efforts to promote vaccination among hesitant populations should consider these individual, interpersonal, and contextual factors and utilize these strategies to address key public health concerns surrounding the ongoing pandemic and allow citizens to return to life as "normal".

Strengths & limitations

This the first qualitative study, to our knowledge, directly assessing the concept of "reverse vaccine hesitancy" during the COVID-19 pandemic. We were able to gather a variety of perspectives regarding COVID-19 vaccination amongst a population that is generally cautious about discussing their hesitancy to vaccinate their children. However, our study had a few limitations to our study. Time constraints for data collection constituted a major study limitation, as we were only to collect data from a limited range of demographic characteristics, namely race/ethnicity, gender, and education status. Future studies should continue to evaluate this phenomenon amongst participants who identify from marginalized or underrepresented identities to maximize equity in vaccination coverage. Despite these limitations, our findings provide robust, groundbreaking evidence regarding the phenomenon of reverse vaccine hesitancy.

Conclusion

Overall, we found that trust in vaccine safety and efficacy, a sense of collective community protection, positive peer pressure, and reduced structural barriers played a significant role in promoting COVID-19 vaccine uptake amongst a historically vaccine hesitant population. We provide a series of recommendations for public health practitioners to increase vaccine acceptance and uptake amongst these populations. Findings can help public health researchers and practitioners drive vaccinate uptake and hopefully, bring the end of the pandemic in sight.

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Appendix 1: Interview Guide

Instructions
Hello and thank you for participating. During this interview I will ask you questions about your attitudes and beliefs about vaccinations in general and specifically about the COVID-19 vaccine. There are no right or wrong or desirable or undesirable answers. I would like you to feel comfortable with saying what you really think and how you really feel. Please feel free to deny responding to any question if you feel uncomfortable or let me know if any of the questions are unclear to you.

Audio Recording
If it is okay with you, I will be audio-recording our conversation. The purpose of this is so that I can get all the details but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be transcribing your responses in a report which will contain comments including any of your personal identity information. The audio recording will be destroyed after I'm done transcribing our conversation. Do you consent to me recording?

Informed Consent
Before we get started, please take a few minutes to read and sign this consent form.

Warm-up
Let's start with a few simple questions to get things started.
1. How long have you lived in Vashon?
2. Would you please tell me your age in years?
3. How would you describe your race? [e.g., White, Black, American Indian, etc.]
4. How would you describe your gender?
5. What is the highest level of education you have completed?

Ok, now we can get started. Thank you for your attention and responsiveness thus far.

<table>
<tr><th>Construct</th><th>Question</th></tr>
<tr><td colspan="2">I would first like to ask a few questions to better understand your general decisions around vaccinating your children and yourself.</td></tr>
<tr><td colspan="2">1. Think back to when you were making the decision around vaccinating your children for key disease such as measles, mumps, rubella, or other CDC-required pediatric vaccinations. What was your attitude towards these vaccinations?
a. What are some factors that led you to have this attitude?</td></tr>
<tr><td colspan="2">2. Think back to when you were making the decision around receiving routine vaccinations for yourself (annual flu shot, measles boosters, HPV, travel vaccines etc.). What was your attitude towards these vaccinations?
a. What are some factors that led you to have this attitude?</td></tr>
<tr><td colspan="2">I would now like to ask a few questions about your attitude towards the COVID-19 vaccine.</td></tr>
<tr><td rowspan="2">Attitude towards the behavior</td><td>3. What is your current attitude towards the COVID-19 vaccine?
a. Where do these beliefs come from i.e., what are some factors that led you to have this attitude?
b. How has this attitude changed over time?</td></tr>
<tr><td>4. What benefits, if any, do you associate with the COVID-19 vaccine?
a. Can you tell me a little bit more about that?</td></tr>
</table>

	5. What disadvantages, if any, do you associate with the COVID-19 vaccine? a. Can you tell me a little bit more about that?
Next, I would like to ask you a few questions about other people in your life or other influential resources that played a role in your decision to receive the COVID-19 vaccine.	
Subjective Norms	6. Think back to when the COVID-19 vaccine first became available in Vashon. What were the beliefs in your immediate community regarding the COVID-19 vaccine? a. What is your perception about these beliefs? Did you agree? Did you disagree? Why?
	7. How do you think the important people in your life (e.g., your spouse, children, friends, doctor etc.) regarded the COVID-19 vaccine at that time? a. What is your perception about their attitudes? b. How did their attitudes influence your own decision?
	8. Think about the key sources that you used to get information about the COVID-19 vaccine before receiving it. What are your perceptions about these sources? a. Which ones did you trust the most? Why? b. Which ones did you trust the least? Why? c. How did your perceptions of trust in these sources influence your decision to vaccinate?
I would now like to ask you a few questions about the factors that impacted your control over getting the COVID-19 vaccine	
Perceived Behavioral Control	9. What are some factors that personally motivated your own ability to get the vaccine? a. How important were these factors in leading you to getting the vaccine?
	10. What are some structural elements that motivated your ability to get the vaccine? a. *If people have trouble understanding what structural elements: You could think about the location of the vaccination site for example* b. How much did these factors impact your decision to get the vaccine?
	11. What are some barriers, if any, that complicated your ability to get the COVID-19 vaccine? a. Can you tell me more about that?
My last few questions are how getting the COVID-19 vaccine has impacted your beliefs about other vaccinations.	
12. How has your experience with the COVID-19 vaccine impacted your current perceptions around required pediatric vaccinations? a. Can you tell me more?	
13. How has your experience with the COVID-19 vaccine impacted your current perceptions around required adult routine vaccinations (e.g., flu shot)? a. Can you tell me more?	

Interview Closing

Thank you for your time today. Before we end, do you have any other thoughts about anything we discussed today that you did not get a chance to share? If you have any questions for me after we end this interview, please feel free to contact m using the information on the consent forms. Again, thank you for your time and have a great day.