

“In the beginning, I said I wouldn’t get it.”: In-depth Qualitative Interviews to Understand Vaccine Hesitancy, Acceptance, and Decision-Making in Remote Alaska between November 2020 and July 2021

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Abstract

Background

Despite leading national rates early in the pandemic, COVID-19 vaccine coverage in Alaska currently ranks 26th nationwide. Prevailing literature primarily reports urban or aggregated data. Here instead, we further characterize the complex decision-making around the COVID-19 vaccine based on in-depth interviews with Alaskans living off the road system.

Methods

We conducted 38 semi-structured in-depth interviews by phone with remote Alaska residents. Interviewees were survey respondents who had self-selected for a follow-up interview, and were predominately Indigenous, female, with post-secondary education. Interviews occurred in February and July 2021, after emergency use COVID-19 vaccine approval.

Results

Of 38 interviewees, 16 (42%) were “low intention” or “deliberating” vaccine acceptance based on their survey responses. Of these, 13 (81% of low-intention/deliberating) got vaccinated between the survey and follow-up interview timeframes. Vaccinated interviewees were motivated by individual-level perceptions of benefits (n = 18, 82%), protecting others (n = 6, 27%), and current or potential requirements (n = 7, 32%). Over half (n = 22, 58%) had vaccine-related concerns, including 13 (46%) of those vaccinated. Concerns primarily pertained to safety (n = 18, 47%), especially potential side effects (n = 11, 29%). Interviewees reported using multiple sources to make their decision, including media (n = 18, 49%) and interpersonal interactions (n = 16, 42%). Confidence among vaccinated/high-intention interviewees was attributed to trusting the source and/or information (n = 14, 44%), learning from others (n = 9, 28%), and personal experiences (n = 8, 25%). Scientific knowledge does not appear to have been a dominant factor for decision-making. Unvaccinated/low-intention interviewees (n = 5) desired more time and information.

Conclusions

This paper illustrates how vaccine hesitancy and acceptance are dynamic decisions that are influenced by complex processes involving knowledge circulation and reception. These results show that even those who respond that they will “definitely not” get vaccinated may change their minds at some future point. Further, vaccinated individuals may still have vaccine-related concerns. These findings indicate that building vaccine confidence involves a combination of consistent messages disseminated through a variety of media, as well as interpersonal interactions and observations. Trusting the source and/or understanding the information, as well as having a sense of agency appears to be important to interviewee decision-making, regardless of vaccination status and intention.

Background

“In the beginning I said I wouldn’t get it. [But] I felt like I really needed to with things opening up, and with my job when I’m going to be around a large group of people. It was more beneficial for me to have it.”

- *Alaska Native mother and remote hub resident*

As of February 2022 approximately 62% of Alaskan residents 5 years and older have completed their primary COVID-19 vaccination series (2 doses) State of Alaska Vaccine Monitoring Dashboard (2022). Vaccine coverage rates range widely by region, from 70% of residents over the age of 5 years in Interior and Southeast Alaska and Anchorage to 40% in the Matanuska Susitna Valley and North Slope. Although in early 2020 Alaska led the nation in per capita vaccinations, as of February 2022 the state had fallen to 26th in the nation (1).

There is an urgent need to understand decision-making leading to vaccine acceptance in order to increase COVID-19 vaccine coverage. The World Health Organization (WHO) has defined vaccine hesitancy as a “delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence” (2). According to the WHO working group, vaccine hesitancy occurs on a spectrum, from full acceptance/high demand, delay, refusal of some vaccines, to complete refusal of all vaccines. Recent studies in the U.S. have showed declining acceptance of the COVID-19 vaccine associated with political party affiliation (3), while a recent Italian study showed a small but significant increase in COVID-19 vaccine confidence (4). A review of South African surveys on COVID-19 vaccine acceptance noted the social nature of vaccine decision making (5). To date, there are few studies that use in-depth interviews to explore vaccine hesitancy, acceptance, and the complex decision-making across that spectrum. Further, the global vaccine acceptance and hesitancy literature relies predominately on urban or aggregated data: few studies explore vaccine acceptance and hesitancy in rural or Indigenous populations.

In this paper, we characterize the complex decision-making around the COVID-19 vaccine among 38 rural-residing, predominately Indigenous and female, Alaskans. Our analysis is based on two waves of semi-structured interviews conducted in February and July 2021 with individuals who had participated in online surveys in November 2020, and March 2021 (Hahn 2022).

Methods

We implemented two rounds of a statewide online survey to assess the impacts of and responses to the COVID-19 pandemic in remote Alaska (communities located off the road system). Survey 1 ran from November 9-December 15, 2020 (prior to the FDA approval and widespread availability of COVID-19 vaccines), and Survey 2 ran from March 9-March 31, 2021, after tribal health organizations had extended eligibility for COVID-19 vaccines to non-Native residents aged 16 years or older. The results of these two surveys are reported in a separate manuscript, *Hahn et. 2022*. Survey respondents had the option of self-

selecting to participate in a follow-up semi-structured in-depth interview, which we conducted by phone or Zoom call in March 2021 for Survey 1 respondents, and July 2021 for Survey 2 respondents.

All interviews occurred after the approval of COVID-19 vaccines for emergency use (Fig. 1). Survey 1 follow-up interviews coincided with the rollout of vaccinations in remote Alaska, and after tribal health organizations had extended their eligibility to all residents in their service region aged 16 years or older, regardless of race-ethnicity. Survey 2 follow-up interviews corresponded with the second major peak in COVID-19 incidence in the state, during which hospitals had to shift to crisis standards of care.

We used a purposeful sampling approach to select the participants for the semi-structured interviews based on survey results, and populations who were under-represented by our survey sample. Based on these criteria, we oversampled men, pregnant women, individuals who responded "definitely not" to all vaccine questions on the survey (including whether they had received and/or were planning to receive a vaccine), respondents who said they or a family member had tested positive for COVID-19.

We developed interview questions to explore topics enumerated by the surveys, as well as community-based concerns identified by our Elder advisor (Cochran) based on her interactions with community members and other Elders. Interviews lasted 30–60 minutes, and covered how the pandemic had affected the interviewee and their family, food access, water access, coping strategies, COVID-19 vaccine perceptions and access, and personal reflections on community strengths and needs.

Development of Analytical Framework

Interviews were analyzed using MAXQDA coding software using *a priori* master themes (Hahn et al, 2021). We then developed subthemes and additional master codes using *in vivo* coding (using participants' actual words) and iterative inductive coding, first of specific questions and then through lexical searches for key words based on codes, as well as re-reading interview transcripts. We use quotation marks to designate *in vivo* codes.

In order to facilitate comparability of our findings globally, we based our final analytical framework (see Additional File 1) on categories developed in 2015 by the WHO SAGE Working Group on Vaccine Hesitancy, as well as those used more recently by Alzubaidi et al (2021) and Elwy et al (2021) whose study methods are similar to our own. We categorized interviewees into low-intention (interviewees responded on the survey that they would definitely not/probably not get vaccinated), deliberating (interviewees who responded that they would maybe get the vaccine or were unsure), and high-intention (interviewees responded they would definitely yes/probably get vaccinated).

To understand how interviewees learned about COVID-19 vaccines, we consulted anthropological literature on biocommunicability, risk discourses, and knowledge production during novel epidemics (6–9). The term *biocommunicability* refers to "the production, circulation, and reception of knowledge" related to medical and medicalized domains (6). This knowledge circulates as various and contested models that explain the origins, risks, preventative actions, and appropriate responses. Under this framework,

perceptions of risk and the benefits of vaccines are not “misperceptions” or lack of knowledge, but rather explanatory models that are produced, circulated, and received at various levels of positionality and subjectivity. Viewing vaccine-related perceptions as explanatory models enables us to glimpse at the complex lived experiences of risk and decision-making that intersect with “notions of subjectivity, authority, knowledge, intertextuality, space, time, and knowledge/actions relations” (Briggs and Nichter, 2009: 193).

Positionality statement

Our research team is led by a multi-ethnic group of Alaska Native and White researchers of mixed ancestral backgrounds, three of whom grew up in Alaska. Perhaps the biggest difference in our backgrounds compared to the population we surveyed and interviewed is that we reside in the largest city in Alaska. To account for that difference in perspective, as well as any additional cultural differences, we worked with Alaska Native and Non-Native leaders and service providers in remote communities to develop study methods, and to review interview and survey questions. All five individuals who conducted the interviews were women, and three were Alaska Native/American Indian interns involved in the Alaska Native Tribal Health Consortium Indigenous Research Program. Findings were first reviewed by the research team leaders (Eichelberger, Cochran, Fried, and Hahn), and then by anonymous reviewers and Alaska Native board members within the Alaska Native Tribal Health Consortium for both scientific rigor and cultural appropriateness.

Results

We conducted 38 in-depth follow-up interviews with survey respondents, the majority of whom were female (n=27, 71%), aged 25-54 years (24, 63%). Most interviewees identified as AN/AI (n=27, 71%), and 14 (37%) identified as white. Ninety-seven percent of our sample (36 individuals) had post-secondary education, including 16 (42%) who hold post-secondary degrees. A little over half (n=21, 55%) of our interviewees were employed full time.

[Table 1 is in the supplementary files section.]

Vaccination status and motivations

Table 2 shows the responses of our 38 interviewees to the survey question “Do you plan to receive a vaccine?”, compared to their subsequent interview response to the question, “Are you vaccinated?”

Table 2: Vaccination status and intention, survey versus interview responses

Survey: Do you plan to receive a vaccine?	Interview: Are you vaccinated?	
	Yes, vaccinated	No change, not vaccinated*
Low intention (7, 18%)	5	2
Deliberating (9, 24%)	8	1
High intention (9, 24%)	8	1
N/A (already vaccinated, 34%)*	13	n/a
	34	4
*All interviewees in N/A category were surveyed post-vaccine availability.		
*1 high-intention unvaccinated interviewee was pregnant and waiting until she gave birth.		

Of 38 interviewees, 7 (18%) were “low intention”. An additional nine individuals (24%) indicated they were “deliberating”. Of these 16 low-intention and deliberating individuals, 13 (81% of low-intention/deliberating, and 34% of total interviewees) had received a vaccine between when they answered the survey and when they participated in a follow-up interview. Only four interviewees had not been vaccinated at the time of their interview. Two reported that they were waiting until after they gave birth (including one high-intention individual). Two desired more information about the vaccine to make their decision.

Table 3 shows the individual-, interpersonal-, and institutional level motivations reported by 22 (69%) of vaccinated interviewees, and one high-intention unvaccinated individual. We included this high-intention interviewee because she reported that she would get vaccinated to protect family members, but that she was waiting because of concerns of potential side effects during her pregnancy. The majority of interviewees (n=18, 82% of those who answered the question) were motivated by individual-level perceptions of risks and benefits. Eight individuals were motivated by a desire to travel (including 3 who were also motivated by travel-related requirements), and three got vaccinated to help their emotional wellbeing. Six interviewees (27%) were motivated to get vaccinated by a desire to protect others, particularly family and vulnerable household members. Seven interviewees (32%) reported that they were motivated to get a COVID-19 vaccine by current or potential institutional factors, such as employer and travel-related requirements. Only five individuals (not included in Table 1) remained unvaccinated at the time of the interview. All were concerned about potential side effects, and two reported that they did not get vaccinated because they distrusted the incentives (referred to by interviewee as “bribes”) and/or vaccine requirements (“I didn’t want it forced on me.”).

[Table 3 is in the supplementary files section.]

Vaccine- and Vaccination-Related Concerns

We asked all interviewees, regardless of vaccination status or intention, whether they had any concerns about getting a COVID-19 vaccine. Over half of the interviewees (n=22, 58%) had concerns, including 13 individuals who received a vaccine (representing 46% of vaccinated interviewees). The majority of concerns pertained to safety (n=18, 47%), especially the potential side effects (n=11, 29%). A small number of interviewees were concerned about the rushed production (n=5, 13%). Only four (11%) individuals in our sample described distrusting the producers and/or motivations behind the vaccines' distribution. Other concerns included efficacy (n=3, 8%) and maintaining bodily purity (n=2, 5%). A little less than half of the interviewees (n=17, 45%) reported having no concerns, including one unvaccinated individual who said they were not worried about getting COVID-19.

Table 4: Interviewee concerns related to getting a COVID-19 vaccine

Concerns	#	%	Definition/Example
Safety	18	47%	
Potential side effects	11	29%	Concerns related to potential side effects, including vulnerability while pregnant and/or breastfeeding, side effects for kids
Process-related: rushed production	5	13%	Concerns related to quick development timeline ("rushed production", "it's in the experimental stage"), desire for more research, new technology
Ingredients	1	3%	"I'm concerned because there are parts of the virus in the shot"
Distrust	4	11%	Distrust in producers, political-economic motivations
Efficacy	3	8%	Uncertain/concerned about whether the shots work, and for how long
Keeping body pure	2	5%	Concerned about introducing foreign substances into body
No concerns	17	45%	Interviewee had no concerns, or no longer has concerns
Total interviews coded	38	100%	
Codes are not mutually exclusive; segments may be coded with multiple codes			

Decision-making around getting a COVID-19 vaccine: Information sources and facilitators

We asked two questions to understand how individuals made their decision as to whether they would get vaccinated against COVID-19: "Where did you learn about the vaccine to make your decision?" and "What made you/would make you feel confident and/or safe about getting a COVID vaccine?" (All interviews occurred after the FDA approved Pfizer, Moderna, and Johnson & Johnson vaccines for emergency use, but prior to the first FDA approval of a COVID-19 vaccine (Pfizer, in August 2021).) Interviewee's answers to these questions often overlapped. We therefore coded answers related to information sources as "Where: sources of information" (Table 5), and those that described the processes, including specific information and experiences, as "What made you/would make you feel confident/safe" (Table 4).

Interviewees reported drawing upon a multitude of sources to make their decision (see Table 6). Almost half (n=18, 49%) reported relying on some combination of media sources (including social media, websites, news media, and scientific reports). Sixteen (42%) reported that the information they received through interpersonal interactions figured strongly into their decision-making, including healthcare providers, friends, and interactions through their professional network. Five interviewees specifically mentioned speaking to family and friends who were healthcare providers and/or could explain the biological principles behind the vaccines. Only three of our interviewees cited Elders and/or stories of the impacts of prior pandemics as motivating factors in their decision to receive a COVID-19 vaccine.

Table 5: Information sources interviewees used to decide whether to get a COVID-19 vaccine

Source of information	#	%
Media	18	47%
Social Media & Internet	11	
News	9	
Science Articles & Reports	4	
Radio	2	
Interpersonal interactions	16	42%
Healthcare providers	7	
Family & Friends	7	
Professional network	5	
Elders, Historical Memory	2	
"Word of mouth"	2	
Public Presentations & Advertising	8	21%
Independent Research (unspecified)	6	16%
Interviews coded	38	100%
Codes are not mutually exclusive; segments may be coded with multiple codes		

Table 6 reports answers to the question *“What made you feel confident and/or safe about getting a COVID vaccine?”* given by 30 of the 34 vaccinated interviewees. Fourteen interviewees (44% of the 30 who responded) reported that they decided to get vaccinated because they trusted the source of the information they received, including eight individuals who mentioned specifically trusting the science behind the vaccine development and efficacy regardless of whether or not they understood the science.

Scientific knowledge does not appear to have been a dominant factor among our vaccinated interviewees. Only four indicated that they understood the scientific information regarding COVID-19 vaccines that was conveyed to them, including two interviewees who referred to the efficacy of the vaccines as a motivating factor.

Agency and having a sense of control in information-gathering appears to be important to interviewee decision-making. Four interviewees described that what was particularly important to them for building trust and confidence was the ability to ask questions of public health leaders and healthcare providers, and feeling satisfied that their concerns were recognized and questions were answered. Four interviewees noted that they did “independent research”, which included consulting multiple media sources and scientific reports. A common theme throughout all of these answers is that the interviewees felt a level of control with regard to the information they received and the process of learning about the vaccines: they initiated conversations, they were able to ask questions, and/or they sought out information on their own.

Another theme was learning from the experiences of others (n=9, 28%), including through pictures and stories disseminated through the media, observing the experiences of friends and family, and learning from Elders about the impacts of previous pandemics. One quarter of interviewees (n=8, 25%) described their personal experiences that increased their confidence, including a positive environment where they received their shots, and prior familiarity with vaccines.

Table 6: Facilitators: Processes and specific information that made interviewees feel confident and/or safe about getting a COVID-19 vaccine among 29 vaccine recipients and one high-intention unvaccinated individual.

Theme	#	%*	Example
Trust in information and source	14	44%	
Trust in science (regardless of understanding)*	8		I had conversations with my friend who is a biology student. She was giving the science behind it. I was worried about the ingredients. She explained the process of what the vaccine is, and that it wasn't as scary as everyone thought.
Being able to ask questions of public health leaders, healthcare providers (non-family/friends)	4		The [Alaska] Tribal Health Consortium did a presentation here - the Chief Medical Officer - about the vaccines, the process to make them, what the speed means/doesn't mean. That was really cool to go to and hear community concerns.
"Independent research"	4		We've done a lot of independent research on it, all the NPs, RNs, doctors, and they've been very strong advocates in the community - and they made me believe. If you're vaccinated, you don't have to quarantine for travel anymore, so hopefully that will help. I told my family that this vaccine is a privilege - that we are getting the vaccine because we're part of a small Tribal community.
Others' experiences	9	28%	
Pictures and stories of others' experiences, including political leaders and celebrities	3		I learned from local health providers talk about the risks and the benefits. Learned that it wasn't rushed. But it was seeing Biden and Kamala and people in Trump's cabinet, sports stars, celebrities... It was encouraging to see so many people get it, even if they were nervous about it.
Family and friends' experiences	3		I felt a little better, I mean I'm still kind of cautious. My mom took the shot and my aunties took the shot, so I was the only one left. I had to think a while, then I thought, "I might as well". Then if it was mandatory, I could tell them I already got the shot.
Historical memory of prior infectious outbreaks/pandemics	3		A lot of Elders, our parents told us about the Black Plague, and would tell us "That could happen again, you have to be careful." That really encouraged people to get the vaccine, because we heard those stories. The village where my dad was, that almost wiped them all out. I've travelled a lot... I let them know, it's something you've got to do. The person that's gonna suffer is you if you take this lightly.

Personal experiences	8	25%	
Positive environment where received shot	2		They made vaccination fun - free coffee, donuts, cookies, good music, etc. It was a positive process. There were a lot of Elders there.
Prior familiarity with shots	3		I always get the flu shot, so it made sense to get the COVID shot.
Total interviews coded**	32	84%	
Codes are not mutually exclusive; segments may be coded with multiple codes			
*Only 4 interviewees indicated that they <u>understood</u> the science by citing statistics or examples.			
*Results represent % of interviews coded (n=32, 84% of all interviews)			

In Table 7 we report the responses of five low-intention interviewees, four of whom were not vaccinated at the time of the interview, who described what would make them feel more confident and/or safe in getting a COVID-19 vaccine along with their vaccination status and plans for vaccination. (We included one vaccinated interviewee in this table because she reported that she would not have gotten vaccinated if she had not been required to.) A common theme of four of the five interviewees was the desire for more time and more information. (One interviewee who was unvaccinated responded that nothing would increase her confidence.)

Table 7 Facilitators: Responses to “What would make you feel confident and/or safe about getting a COVID-19 vaccine?” among deliberating and low-intention interviewees.

What would make you feel confident/safe?	#	%*	Coded text	Vaccination status
Consistent information	1		I wish we had an answer for that question, we're just not sure right now. The guidelines keep switching back and forth with CDC and WHO because it's a new and changing virus, but also sometimes what they say just feels so contradictory. Sometimes it's hard to know if they're making some of their decions because of medical reasons, or because of convenience on time of year (i.e. needing a 14 day quarantine and masking vs not needing those precaution when you get a vaccine).	Not vaccinated, Deliberating
Stories from people like me	1		Other moms talking about their experience with it.	Not vaccinated, Deliberating
More information about who and how made	1		I would've felt more confident if the scientists were able to take their time or had more time instead of rushing and pushing it, and knowing which scientists worked on it and what all went into it, because all we got was a call about getting it. Like, was the vaccine made in America, was it made by the world, what was put into it.	Vaccinated, Low intention*
More time and more testing; Not being pressured/required to accept a vaccine	2		Time and more testing. I have not liked all of the incentives as they seem like bribes for people to get the vaccine. [...] It felt like the government and city should stay out of people's right to chose what to do about your body. I didn't like the government or my job promoting one decision about the vaccine. I would rather just have them put out information. I feel like they should be more neutral and just give out information.	Not vaccinated, Low intention
Nothing	1		[Interviewee responded that nothing would increase their confidence in the COVID-19 vaccines.]	Not vaccinated, Low intention
Total interviews coded	5	14%		
Codes are not mutually exclusive; segments may be coded with multiple codes				
*Interviewee reported they got vaccinated because were required to due to family member's surgery, otherwise would not have chosen to get vaccinated.				
*Results represent % of interviews coded (n=5, 13% of all interviews)				

Conclusions

The population included in this study is unique within the United States due to the remoteness of their communities and high proportion of Alaska Native participants, thus providing insight into this important but understudied population. Rural populations are often at higher risk and more vulnerable during disease outbreaks due to limited medical access, and are often most difficult to reach for public health interventions. In remote Alaska, access to vaccines does not appear to have been a barrier to vaccine uptake, likely because of the small geographic size of these communities and the fact that the tribal health organizations had a strong vaccination infrastructure and expanded eligibility to non-Native residents. Although this uniqueness could limit generalizability of these data, similar findings are reported in the global literature on COVID-19 vaccine acceptance and perceptions, as well as qualitative studies on participant perceptions around the introduction of HPV and H1N1 vaccines.

This paper illustrates how vaccine hesitancy and acceptance are not static categories, but dynamic decisions that may change over time (2), and which are influenced by complex biocommunicable processes involving knowledge circulation and reception (6, 8, 10, 11). While there are clearly people who could be identified as vaccine “refusers” or “anti-vax”, our results show that even those who respond that they will “definitely not” get vaccinated may change their minds at some future point. Some public health practitioners refer to this group as the “moveable middle” (e.g. CDC 2021). A little less than half of the interviewees were low-intention or deliberating at the time they participated in the online survey (n = 16, 42%), but almost all had received a COVID-19 vaccine prior to their follow-up interview. Trends in vaccine hesitancy and acceptance among our interviewees reflect our larger survey sample where we found that by March 2021, over 80% of respondents had received a COVID-19 vaccine or planned to get one in contrast to only half of respondents stating an intention to get vaccine when asked four months earlier (Hahn et al 2022).

In order to understand COVID-19 vaccine-related decision-making and how individuals’ intentions may change across the spectrum of vaccine hesitancy, we explored stated motivations, information sources, and what made vaccinated interviewees confident. Interviewees’ responses indicate that the drivers of vaccine acceptance are not mutually exclusive, nor limited to knowledge, attitudes, and beliefs. Based on the concept of biocommunicability and our interviewees’ accounts described above, we therefore approach communication as part of the decision-making experience that involves both public health messaging, interpersonal interactions with friends, family, and others, as well as observations. This approach to communication better reflects Indigenous ways of knowing that emphasize observation, listening, relationships, and historical memory through storytelling (e.g. 13,14).

Among the comparatively small sample of unvaccinated interviewees (n = 5), all chose not to get vaccinated because of perceptions of low personal risk, and two also mentioned incentives and mandates as deciding factors behind not getting vaccinated. Despite our small sample of unvaccinated interviewees, these differences between the motivations of vaccinated/high intention and unvaccinated individuals are similar to the findings of other studies (15–19). For example, Alzubaidi et al (2021), whose United Arab Emirates-based study used data from surveys and follow-up interviews with students, reported that the

responses of high-intention and vaccinated students reflected societal responsibility, while responses of low intention unvaccinated participants appeared to be motivated by individual benefits.

Vaccinated individuals may still have concerns about a vaccine and/or vaccination campaign. We asked interviewees whether they had concerns about getting a COVID-19 vaccine, regardless of their vaccine status. Over half of interviewees (n = 21, 57%) had vaccine-related concerns, including 13 vaccinated individuals (representing 46% of vaccinated interviewees). Despite the uniqueness of our study population, interviewees' vaccine-related concerns are largely similar to those reported in the global literature on COVID-19 vaccine hesitancy (e.g. 15,16,19,20): safety (n = 18, 49%), rushed production (n = 5, 14%), distrust in motivations behind production and/or distribution (n = 4, 11%), efficacy (n = 3, 8%), and maintaining bodily purity (n = 2, 5%).

Our findings indicate that building vaccine confidence involves a combination of consistent messages disseminated through a variety of media sources, as well as interpersonal interactions and observations. The major theme of what increased interviewees' confidence about getting a COVID-19 vaccine were trust in the information source (12, 40% of the 30 who responded). Learning from family, friends, and the broader community (Elders, "word of mouth") was common theme throughout conversations regarding both information sources and what made interviewees feel confident. These findings provide evidence that supports the current CDC approach that encourages individuals to share their own stories of why they got a COVID-19 vaccine (21).

Indeed, trusting the source and/or understanding the information, as well as having a sense of agency appears to be important to interviewee decision-making, regardless of vaccination status and intention. Trust may be more critical to vaccine acceptance than individual understanding of the science behind vaccines (see also Lockyer et al, 2021; Roberts et al, 2021). Only four interviewees indicated that they understood the scientific information regarding COVID-19 vaccines that was conveyed to them. Five vaccinated interviewees described that what was particularly important to them for building trust and confidence was the ability to ask questions of public health leaders and healthcare providers, and feeling satisfied that their concerns were recognized and questions were answered. Four interviewees (both vaccinated and unvaccinated) noted that they did "independent research", which included consulting multiple media sources and scientific reports. A common theme throughout all of these answers is that the interviewees felt a level of control in where they received the information and the process of learning about the vaccines: they initiated conversations, they were able to ask questions, and/or they sought out information on their own. With the exception of one interviewee, those who were still unvaccinated desired more information and more time to make their decisions.

Another dominant theme was learning from the experiences of others, including through pictures and stories disseminated through the media, observing the experiences of friends and family, and learning from Elders about the impacts of previous pandemics. Past and present personal experiences with shots were important to one quarter of interviewees. Only two of our interviewees cited the efficacy of the vaccine as a motivating factor. Interestingly, none of our low-intention or unvaccinated interviewees

mentioned specific people nor information sources that influenced their decision not to get vaccinated. However, we may be able to explore this topic further with a larger sample size in the future.

Discussion

Taken together, these findings show that building on trusted relationships is key to increasing vaccine acceptance, which involves acknowledging concerns rather than approaching them as education deficits. In the hesitancy literature, vaccine-related concerns are often referred to as “misperceptions” or lack of education to be corrected by education campaigns. Scholars often characterize distrust as distrust in government, though in Alaska and elsewhere vaccine requirements and incentives may exist outside of government purview.

Lockyer and colleagues (2021) suggest that a key to addressing COVID-19 hesitancy is to recognize the emotional reactions to misinformation. To this we add the suggestion that we recognize how individual and collective identities may be formed and threatened by top-down public health messaging. Briggs and Nichter (2009:193) suggest we should think of concerns less as misperceptions and more as explanatory models of disease and risk that compete with authoritative versions from public health and produce particular identities. “Any account of infectious disease reifies certain players, circuits, practices, and forms of authority and imbues them with different moral and affective characters to produce and hold knowledge.” In other words, identities are produced through authoritative messages, and individuals either position themselves within those identities or against them. This is evident in survey data that has shown associations between political affiliations and vaccine acceptance (3,e.g. 5). If, as public health professionals, we characterize individuals as immoral, misinformed, or uneducated vis-à-vis their decision to get vaccinated, we threaten their identity and their dignity as decision-makers.

Acknowledging patient concerns and recognizing the production of identities and authority that occurs within public health campaigns is particularly important to consider when working with marginalized populations, who may already be distrustful of institutions and/or individuals who represent the dominant population (e.g. middle class, White, etc.). Other studies conducted with Indigenous participants on vaccine acceptance indicate that institutional distrust is rooted in the colonial experience, including vaccine trials that used Indigenous peoples as guinea pigs and colonial policies that created inequities in housing, water- and food security, thus leading to greater vulnerability among Indigenous populations to infectious diseases (22–26). At the same time, vaccine acceptance among Indigenous peoples may be rooted in a shared sense of responsibility to community and cultural preservation (27).

Increasing vaccine acceptance in small, rural communities may be challenged by the dynamics of small town life: everyone knows each other, and maintaining cordial relationships and friendships can take precedence (see also 28). This may be particularly true in a place like Alaska, where people rely on each other’s help, particularly during the cold and dark winter months. In a recent presentation on vaccine hesitancy (29), the CEO of the Mat-Su Regional Health Corporation noted that healthcare workers were hiding the fact that they were vaccinated for fear of alienating other co-workers and community members.

One solution to these challenges of trust is to build upon existing relationships within communities, and to support community- and individual-led communication. For example, storytelling led by community members and trusted influencers may help address the issues related to institutional distrust. Involving individuals across different subjectivities, including – as indicated by one of our interviewees – political affiliations, may help increase vaccine confidence without threatening individuals' notions of subjectivity and identity. Importantly, this involves recognizing that a public health message does not stand on its own: there is no authoritative knowledge about a pandemic, and the categories of vaccine acceptance and hesitancy (e.g. vaccine ready, vaccine refuser, and anti-vaxx) are subjectivities produced and reproduced through the circulation of competing explanatory models. Although individuals may learn about a novel pathogen from news media, their knowledge and risk perceptions are formed by a more complex field that includes top-down messaging, alternative explanations, interpersonal interactions, personal experiences, and observations (30)

This study has several limitations. Our sample is predominately female, Alaska Native individuals ages 25–54 years, and overwhelmingly educated with at least some post-secondary education. It therefore underrepresents men, other age groups and race/ethnicities, and education level. Our sample size does not enable in-depth analyses by vaccine status, age, gender, race/ethnicity, and other characteristics (such as occupation, pregnancy and/or breast-feeding). Future analyses will explore these differences with a greater sample size.

Importantly, although the majority of our interviewees were Alaska Native, the aggregated findings reported here should not be interpreted to represent all Alaska Native peoples. Interviewees were recruited through an online survey mechanism, thereby excluding those without internet or cell service. However, we believe that this sample is largely representative of remote Alaskan communities within which vaccine-related perceptions would circulate and interpersonal interactions would occur. Future analyses should use a larger sample of in-depth interviews to examine differences in perceptions and decision-making by ethnicity and region.

Only five individuals remained unvaccinated at the time of the interview, which is a small sample for exploring reasons for continued hesitancy and/or refusal. Additionally, for this paper we analyzed interviews conducted during two different timeframes: February and March, 2021 and July, 2021. It is likely that overall acceptance and hesitancy changed between those two timeframes, although both occurred before the SARS-CoV2 delta- and omicron variants (combined with low vaccination coverage) caused cases to rise well above pre-vaccine levels. Future analyses with a greater sample size will enable more in-depth explorations of decision-making around COVID-19 vaccines, including characterizing the motivations of different sub-groups and understanding how individuals move from being against vaccination and/or hesitant to trust and acceptance.

To our knowledge, this is the first paper to report in-depth interview data on COVID-19 vaccine acceptance, hesitancy, and refusal among rural-residing Americans, as well as Alaska Native individuals. Our approach and interview questions have been informed by remote community leaders and service providers, mostly from Alaska Native perspectives, as well as scholarship from global health and medical anthropology. Our

sample includes both Alaska Native and non-Native participants from across diverse socio-cultural regions of the state, which is reflective of the populations of remote Alaska.

We believe one of the main contributions of this study is that we are asking the same questions of each interviewee, regardless of vaccination status or intention. One of the limitations we found in the existing qualitative literature is a tendency to only ask unvaccinated individuals about their vaccine-related concerns and/or barriers to acceptance. Our findings show that vaccine-related concerns may exist across the hesitancy spectrum, even among those who are vaccinated. We suggest that research protocols should include questions regarding reasons for acceptance, hesitancy, and suggestions on how to build confidence around vaccines of all interviewees, regardless of vaccination status.

Given the importance of storytelling and narrative in Indigenous cultures, we encourage other researchers to use interview methods to explore decision-making around COVID-19 and other vaccines. Our findings underscore those of others that for some individuals the decision to receive an unfamiliar vaccine is complex, and that receiving a vaccine is not the same as having full confidence in its efficacy, safety, or necessity.

Abbreviations

CDC

Centers for Disease Control and Prevention

COVID-19

Coronavirus disease 2019

SARS-Cov2

Severe acute respiratory syndrome-coronavirus 2

WHO

World Health Organization

Declarations

Ethics approval and consent to participate

All study methods were reviewed and approved by the Alaska Area Institutional Review Board, as well as the Alaska Native Tribal Health Consortium Health Research Review Committee. All interviewees were consented verbally. This paper was reviewed by the Alaska Native Tribal Health Consortium Health Research Review Committee, who provided feedback that we incorporated into the final draft. All errors are our own.

Consent for publication: Not applicable

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available. Any release of data from this project must be formally requested from and approved by appropriate Tribal leadership.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

LE led the analysis, literature review, and writing, based on master codes developed by RF (reported in *Hahn, et al 2022*). RF calculated population characteristics. PC assisted in interpretation of data and paper framing. MH and RF were major contributors in writing the manuscript. All authors read, provided content, and approved the final manuscript.

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References

1. COVID Vaccinations: County and State Tracker. The New York Times [Internet]. 2022 Mar 2 [cited 2022 Mar 2]; Available from: <https://www.nytimes.com/interactive/2020/us/covid-19-vaccine-doses.html>
2. MacDonald NE. Vaccine hesitancy: Definition, scope and determinants. *Vaccine*. 2015 Aug 14;33(34):4161–4.
3. Fridman A, Gershon R, Gneezy A. COVID-19 and vaccine hesitancy: A longitudinal study. *PLOS ONE*. 2021 Apr 16;16(4):e0250123.
4. Domnich A, Grassi R, Fallani E, Spurio A, Bruzzone B, Panatto D, et al. Changes in Attitudes and Beliefs Concerning Vaccination and Influenza Vaccines between the First and Second COVID-19 Pandemic Waves: A Longitudinal Study. *Vaccines*. 2021;9(9).

5. Cooper S, van Rooyen H, Wiysonge CS. COVID-19 vaccine hesitancy in South Africa: how can we maximize uptake of COVID-19 vaccines? *null*. 2021 Aug 3;20(8):921–33.
6. Briggs CL, Nichter M. Biocommunicability and the Biopolitics of Pandemic Threats. *null*. 2009 Aug 10;28(3):189–98.
7. Eichelberger L. SARS and New York’s Chinatown: The politics of risk and blame during an epidemic of fear. *Social Science & Medicine*. 2007 Sep 1;65(6):1284–95.
8. Hall K, Wolf M. Whose crisis? Pandemic flu, ‘communication disasters’ and the struggle for hegemony. *Health (London)*. 2021 May 1;25(3):322–38.
9. Farmer P. AIDS-talk and the constitution of cultural models. *Social Science & Medicine*. 1994 Mar;38(6):801–9.
10. Hall K. Biocommunicability. *The Biopolitics of Pandemic Communication*. In: Berube DM, editor. *Pandemic Communication and Resilience [Internet]*. Cham: Springer International Publishing; 2021 [cited 2022 Mar 3]. p. 3–18. (Risk, Systems and Decisions). Available from: https://link.springer.com/10.1007/978-3-030-77344-1_1
11. Briggs CL, Hallin DC. *Making Health Public: How news coverage is remaking media, medicine, and contemporary life [Internet]*. 1st ed. Milton Park, Abingdon, Oxon; New York, NY : Routledge, 2016.: Routledge; 2016 [cited 2022 Mar 3]. Available from: <https://www.taylorfrancis.com/books/9781317329879>
12. CDC. COVID-19 State of Vaccine Confidence Insights Report [Internet]. Centers for Disease Control and Prevention; 2021 Aug p. 6. (State of Vaccine Confidence). Report No.: 11. Available from: <https://www.cdc.gov/vaccines/covid-19/downloads/SoVC-report-11.pdf>
13. Chan AS. Chapter 11 Storytelling, Culture, and Indigenous Methodology. In Leiden, The Netherlands: Brill; 2021. p. 170–85. Available from: <https://brill.com/view/book/9789004465916/BP000023.xml>
14. Cochran PAL, Marshall CA, Garcia-Downing C, Kendall E, Cook D, McCubbin L, et al. Indigenous Ways of Knowing: Implications for Participatory Research and Community. *Am J Public Health*. 2008 Jan 1;98(1):22–7.
15. Alzubaidi H, Samorinha C, Saddik B, Saidawi W, Abduelkarem AR, Abu-Gharbieh E, et al. A mixed-methods study to assess COVID-19 vaccination acceptability among university students in the United Arab Emirates. *Human vaccines & immunotherapeutics*. 2021 Sep 17;1–9.
16. Elwy AR, Clayman ML, LoBrutto L, Miano D, Ann Petrakis B, Javier S, et al. Vaccine hesitancy as an opportunity for engagement: A rapid qualitative study of patients and employees in the U.S. Veterans Affairs healthcare system. *Vaccine: X*. 2021 Dec 1;9:100116.
17. Molly Bloom, Shelly Verma, Deepika Ram, Timothy Roberton, Cristina Pacheco, Roberta E. Goldman, et al. COVID-19 Vaccine Concerns and Acceptability by Language in a Marginalized Population in Rhode Island. *Journal of Primary Care & Community Health [Internet]*. 2021 Dec 1;12. Available from: <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,cookie,url,uid&db=edsdoj&AN=edsdoj.bdd2e293ee674636904ad028e873a3f live&custid=s1110059>

18. Roberts CH, Brindle H, Rogers NT, Eggo RM, Enria L, Lees S. Vaccine Confidence and Hesitancy at the Start of COVID-19 Vaccine Deployment in the UK: An Embedded Mixed-Methods Study. *Frontiers in public health*. 2021 Nov 11;9:745630.
19. Knight KR, Duke MR, Carey CA, Pruss G, Garcia CM, Lightfoot M, et al. COVID-19 Testing and Vaccine Acceptability Among Homeless-Experienced Adults: Qualitative Data from Two Samples. *J GEN INTERN MED* [Internet]. 2021 Oct 26 [cited 2022 Mar 3]; Available from: <https://link.springer.com/10.1007/s11606-021-07161-1>
20. Lockyer B, Islam S, Rahman A, Dickerson J, Pickett K, Sheldon T, et al. Understanding COVID-19 misinformation and vaccine hesitancy in context: Findings from a qualitative study involving citizens in Bradford, UK. *Health Expectations*. 2021 Aug;24(4):1158–67.
21. Centers for Disease Control and Prevention. What Is Vaccine Confidence? [Internet]. 2022 Feb [cited 2022 Mar 2]. Available from: <https://www.cdc.gov/vaccines/covid-19/vaccinate-with-confidence/building-trust.html>
22. Mosby I, Swidrovich J. Medical experimentation and the roots of COVID-19 vaccine hesitancy among Indigenous Peoples in Canada. *CMAJ: Canadian Medical Association journal = journal de l'Association medicale canadienne*. 2021 Mar 15;193(11):E381–3.
23. Humble RM, Sell H, Dubé E, MacDonald NE, Robinson J, Driedger SM, et al. Canadian parents' perceptions of COVID-19 vaccination and intention to vaccinate their children: Results from a cross-sectional national survey. *Vaccine*. 2021 Dec 20;39(52):7669–76.
24. Gerretsen P, Kim J, Quilty L, Wells S, Brown EE, Agic B, et al. Vaccine Hesitancy Is a Barrier to Achieving Equitable Herd Immunity Among Racial Minorities. *Frontiers in medicine*. 2021 Nov 24;8:668299.
25. Bowen DJ, Weiner D, Samos M, Canales MK. Exploration of New England Native American Women's Views on Human Papillomavirus (HPV), Testing, and Vaccination. *Journal of Racial and Ethnic Health Disparities*. 2014 Mar 1;1(1):45–51.
26. Toffolon-Weiss M, Hagan K, Leston J, Peterson L, Provost E, Hennessy T. Alaska Native parental attitudes on cervical cancer, HPV and the HPV vaccine. *null*. 2008 Sep 1;67(4):363–73.
27. Urban Indian Health Institute. Strengthening Vaccine Efforts in Indian Country: Results from a National COVID-19 Vaccination Survey [Internet]. Seattle, WA: Urban Indian Health Institute; 2021 [cited 2022 Mar 2]. Available from: <https://www.uihi.org/projects/strengthening-vaccine-efforts-in-indian-country/>
28. Hoffman DN, Stewart AL, Breznay J, Simpson K, Crane JT. Vaccine Hesitancy Narratives. *Voices in Bioethics*. 2021;7.
29. Ripley E, Foo T, Zink A. Overcoming Vaccine Hesitancy [Internet]. *State of Reform Alaska: 5 Slides We're Discussing*; 2022 Jan 2 [cited 2022 Jan 2]. Available from: <https://stateofreform.com/5-slides-were-discussing/2022/01/5-slides-were-watching-overcoming-vaccine-hesitancy-alaska/>
30. Briggs CL, Hallin DC. Biocommunicability Cultural models of knowledge about health. In: *Making health public: how news coverage is remaking media, medicine, and contemporary life*. Milton Park,

Tables

Tables 1 and 3 are in the supplementary files section.

Figures

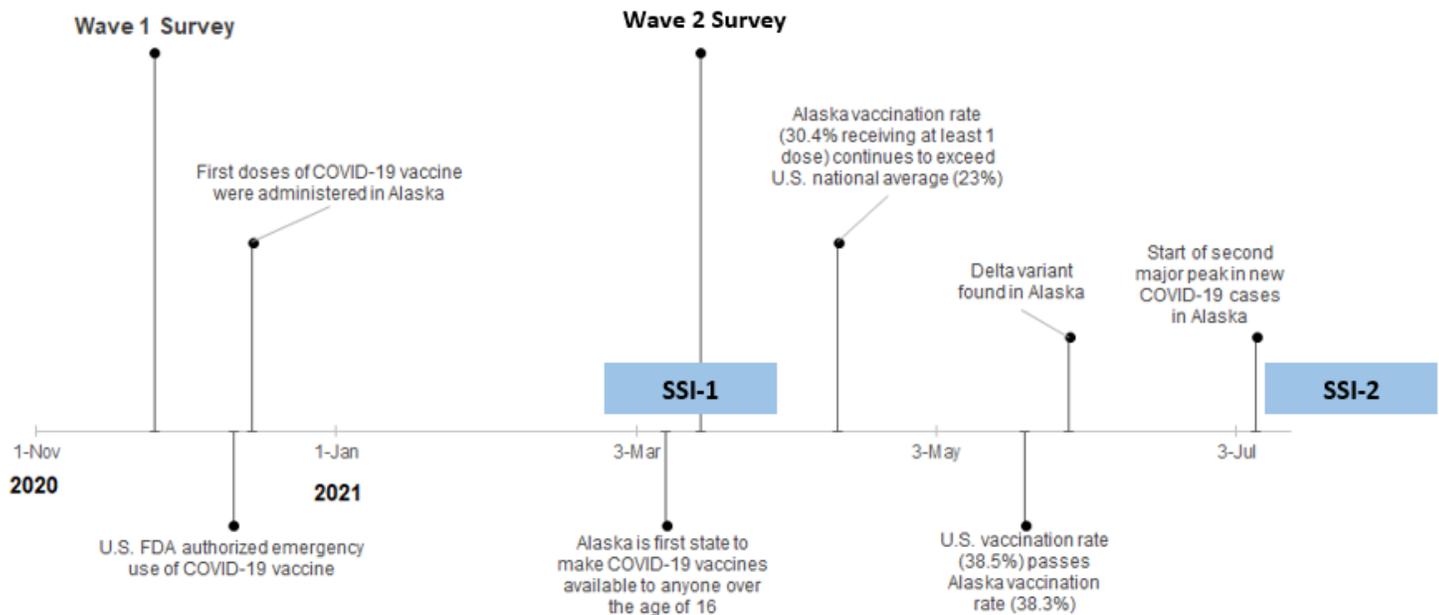


Figure 1

Timeline of surveys and semi-structured interviews (SSI-1 and SSI-2) compared to COVID-19 vaccine availability and major COVID-19 related events in Alaska.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Table1and3.docx](#)
- [AdditionalFile1AnalyticalFramework.docx](#)