



Risk perception, adaptation, and resilience during the COVID-19 pandemic in Southeast Alaska Natives

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ABSTRACT

Indigenous communities worldwide are at higher risk of negative pandemic outcomes, and communities Indigenous to the Arctic are disproportionately affected compared to national majorities. Despite this, their experiences have scarcely been investigated qualitatively and from their own perspectives. We collected and analyzed 22 structured interviews in three Southeast Alaska island communities (Sitka, Hoonah, and Kake) to learn about their perceptions of and experiences with the COVID-19 pandemic. Interviews were analyzed with thematic qualitative analysis in Dedoose. Four primary categories were identified within which to discuss risk and resilience in Southeast Alaska: (1) risk perception, (2) socioeconomic impacts, (3) reactions to public health guidelines, and (4) coping. Primary findings indicate that Southeast Alaska Native communities display considerable resilience and adaptive flexibility despite the significant adversity imposed by the COVID-19 pandemic. Southeast Alaska Native people use historical and traditional knowledge to culturally ground adaptive behaviors to cope with the threat of COVID-19. Interviewees expressed that adaptive, community-centered, and non-individualistic behaviors strongly tied to Native culture minimized the negative epidemiological impacts of the pandemic. Future research can more deeply explore the root causes of the need for adaptiveness and resilience, such as histories of colonialism and marginalization, to emergency situations in Indigenous communities.

1. Background

This study highlights the ways rural Southeast Alaska Native people drew on traditional knowledge and community cohesion in their responses to the COVID-19 pandemic in 2020–21. Such insights emphasize the existing strengths of Alaska Native communities that tend to go unnoticed by research that overlooks and/or homogenize Indigenous experiences, and these insights can help inform communities on how to best prepare for future emergent pandemic stressors. Global Indigenous community disaster responses emphasize the value of Indigenous ecological and cultural knowledge while prioritizing sovereignty to sustain capacity building within communities' responses (Ellemore, 2005; Howitt et al., 2012; Kelmen et al., 2012). Alaska Native communities in the U.S. share various commonalities in both culture and

historical experiences with Indigenous communities internationally, such as tribal sovereignty, a history of colonial hegemony, generational ties to environment, and analogous cultural norms and values. However, their specific histories have led to significant cultural differences as well, making it inappropriate to homogenize individual Native experiences—and those of their hundreds of individual communities—with those of other Indigenous identities worldwide.

Epidemiological and demographic studies of Indigenous communities' pandemic experiences show that they suffered significantly worse outcomes, particularly during the 1918 influenza pandemic (Mamelund, 2003; Mamelund et al., 2013; Rice, 2018) and the 2009 H1N1 influenza pandemic (La Ruche et al., 2009). Alaska and Labrador experienced much higher mortality than the commonly cited percentage of 2.5–5%; Brevig Mission in Alaska experienced upwards of 90% mortality, Okak,

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Labrador experienced 79% mortality and abandonment of the settlement (Mamelund et al., 2013), while the Māori of New Zealand and Sami of northern Scandinavia were at 4–7 times the risk of the non-Indigenous populations (Mamelund, 2003; Rice, 2018). In 2009, Native American people and Indigenous groups of Oceania and the Pacific Islands had significantly higher mortality than non-Indigenous populations, which has been attributed to underlying health conditions (Hennessy et al., 2014; La Ruche et al., 2009), many of which can be further attributed to compounding effects of colonization (Paradies, 2016). Despite a century of hindsight establishing the foundation of knowledge that Indigenous groups tend to suffer unequal pandemic outcomes, responses of Indigenous communities worldwide from their own perspectives have yet to be extensively elevated. There is a general lack of quantitative epidemiological data on the experiences of specifically Indigenous populations apart from aggregate national populations during pandemics, and this dearth can lead to volatile and misleading conclusions about variation within and between populations (Alves et al., 2022). Others have pointed out that high-level population research conflates Indigenous data with those of the larger population (Chatwood et al., 2012), which leads to homogenization of racial, ethnic, nationality, and linguistic categories (Dimka et al., 2022).

Despite these observations using quantitative data for demographic and/or epidemiological purposes, research has emphasized the considerable strength of Alaska Native communities and the ability to adapt to myriad solutions, of which many—if not all—are in response to colonial realities, such as: navigating contradictory values while “walking in two worlds” between Native homes and Western universities (Wexler and Burke, 2011), Native healing methods for post-trauma recovery (Bassett et al., 2012), continually reaffirming cultural traditions, well-being, health, and education through wood carving (Johnson et al., 2021), and the ability to navigate gender roles in response to rapid social change (Graves, 2004). Although this body of literature exists, a recent systematic review found there is very little research that focuses on resilience to guide public health promotion, despite the strengths of Indigenous communities to contribute to those public health programs (Teufel-Shone et al., 2018).

To better understand Indigenous perception, coping, and resilience to an emergent pandemic event, especially behaviors that are driven by community-based guidance and social norms, researchers must engage with Indigenous perspectives directly. The ways in which Indigenous groups represent themselves dramatically differ from the ways non-Indigenous people represent them, and this has been shown to misconstrue the impacts of the COVID-19 pandemic on Native people (Azocar et al., 2021). Qualitative, emic, and ethnographic approaches that are driven by knowledge co-production can provide essential nuance to the comprehensive understanding of how acute respiratory pandemics impact Indigenous people. In this paper, we present results of interviews with Southeast Alaska Native people to illuminate their cultural strengths that helped mitigate the threat of the COVID-19 pandemic.

1.1. Risk and resilience in rural communities

“Risk” is a concept that traverses disciplinary boundaries and carries disparate definitions across them. Risk can be a statistical concept that describes the probability that an event will occur (Benichou, 2007) or a social categorization that describes how some groups are more likely to experience a negative outcome due to ambient social conditions and biosocial histories (Panter-Brick, 2014). Whether or not the term is applied as an epidemiological or social paradigm, Panter-Brick (2014) argues that the concept of risk is a useful one, in that understanding how populations perceive risk gives crucial insight into their cultural values and how biology, culture, and behavior interact within distinct contexts. Risk is most clearly defined as a product of hazard (the probability of an event occurring, in this case COVID), exposure (the probability that a person will be exposed to the hazard), and vulnerability (the likelihood of the hazard affecting the individual or community in an adverse way).

In this way, risk and risk perception are socially, historically, and culturally grounded (Boholm, 1996). For example, the diverse Alaska Native experiences with the pandemic of 1918 and the dependence of culture on oral transmission and Elder knowledge are likely to affect both real and perceived vulnerability to COVID. In turn, different risk perceptions can influence decision making behavior and the ways people perceive relative severity of competing or compounding adversity. In the pandemic context, current population health, the ability to access medical resources, community cohesion, and political division may all contribute to the overall perception of how “risky” the pandemic is.

“Resilience” refers to the capacity to cope and adapt in the face of various stressors or adversity (Norris et al., 2008; Peters, 2020), and emphasizes the adaptability and processes of individuals and systems that promote recovery (Norris et al., 2008). Models of resilience have been applied to different natural disaster and emergency settings as vital coping mechanisms to sustain communities (Cutter et al., 2008; Gunderson, 2010). Resilience can be traced historically as central to the survival of Indigenous communities (Teufel-Shone et al., 2018; Wexler, 2014). Community resilience is largely rooted in the capacities and resources within social, political, and economic structures, and it is more flexible and adaptive when it is culturally grounded (Norris et al., 2008; Wexler et al., 2014). Cultural resilience is embedded in various norms, family structures, and peer relationships (Clauss-Ehlers, 2008). Elements of Alaska Native culture such as spirituality, oral traditions, healing, reciprocity, and collective responsibility may be leveraged as advantageous coping mechanisms (Bassett et al., 2012; Clauss-Ehlers, 2008). These Alaska Native cultural characteristics help illustrate the fact that resilience is strongly tied to culture and place; therefore, observations of resilience in one population are not necessarily transferable to others. This is particularly true for Western models of response and recovery that are distinct from those necessary in remote Indigenous communities.

It is critical to understand the concepts of risk perception and resilience in communities in which health and socioeconomic inequalities exist, yet rarely receive attention and resources. Circumpolar communities’ health disparities tend to be overlooked or homogenized with those of the countries to which they nominally belong, which are overwhelmingly high-income nations (the U.S., Canada, Nordic countries, Kalaallit Nunaat [Greenland], Faroe Islands, and Russia) (Chatwood et al., 2012; Krümmel, 2009). These health disparities are further exacerbated by the challenges of anthropogenic climate change, which has caused rapid environmental shifts that require similarly rapid cultural adaptations that affect rural Indigenous Arctic populations (Ford et al., 2014; Healey et al., 2011). Rural communities face various existing health disparities and challenges in access to healthcare that may increase their risk of COVID-19 compared to urban areas (Peters, 2020; Summers-Gabr, 2020). The COVID-19 pandemic may serve to exacerbate various health, social, and economic vulnerabilities that disproportionately affect rural communities (Mueller et al., 2021; Peters, 2020; Summers-Gabr, 2020).

Past studies have examined COVID-19 risk, safety behaviors, and community responses largely in urban areas (Schuchat & CDC COVID-19 Response Team, 2020; Sharifi and Khavarian-Garmsir, 2020; van Dorn et al., 2020). Smaller, more rural communities face different COVID-19 challenges due to relative resource scarcity, different scales of governance and infrastructure, and different scales of social networks at which social dynamics like status, connectedness, reputation, and stigma operate (Blumenthal et al., 2020; Melvin et al., 2020; Monteith et al., 2020; Mueller et al., 2021). Existing documentation on the direct impacts of COVID-19 on rural communities is often anecdotal (Godfrey, 2021; Khazan, 2021; Kovich, 2020), and a comprehensive exploration of rural community dynamics and perspectives has yet to be explored.

Alaska Native individuals often face socioeconomic, geographic, and environmental barriers that may impede response efforts and require specific considerations that acknowledge these constraints (Allhoff and Goleman, 2020; Safford et al., 2011). These individuals are often studied

Table 1

The number of cases, hospitalizations, and deaths for the duration of the pandemic and for the period over which interview data were collected for each census area in this study. The percentage of cases, hospitalizations, and deaths that occurred within the study period are also provided.

Census Area	April 2020 – present			January–July 2021		
	Cases	Hosp.	Deaths	Cases (%)	Hosp. (%)	Deaths (%)
Sitka City & Borough	3147	30	9	517 (16)	12 (40)	4 (44)
Hoonah-Angoon Census Area	1728	22	10	153 (9)	8 (36)	5 (50)
Prince of Wales-Hyder Census Area	872	13	5	27 (3)	3 (23)	1 (20)

as a homogenous population, without regard to the differences in backgrounds, interests, and needs among them and other Indigenous populations (Jaeger, 2004). Systematic investigations of how rural communities, such as those in Southeast Alaska, experience the COVID-19 pandemic can provide robust insights into the unique challenges they face. Further, the ways rural Alaska Native communities seek to solve and overcome those challenges illustrate their specific modes of resilience.

This study explores concerns, contexts, and risk facing Southeast Alaska Native communities given impending vulnerabilities such as age, comorbidities, and limitations to emergency medical care. Lingít Aaní, or Southeast Alaska, is the ancestral home of the Tlingit, Haida, and Tsimshian peoples; therefore, this study is primarily within the context of their perspectives. We recognize, however, that there may be Alaska Native individuals represented here with other ancestral backgrounds and experiences, as there are eight major Alaska Native cultural areas

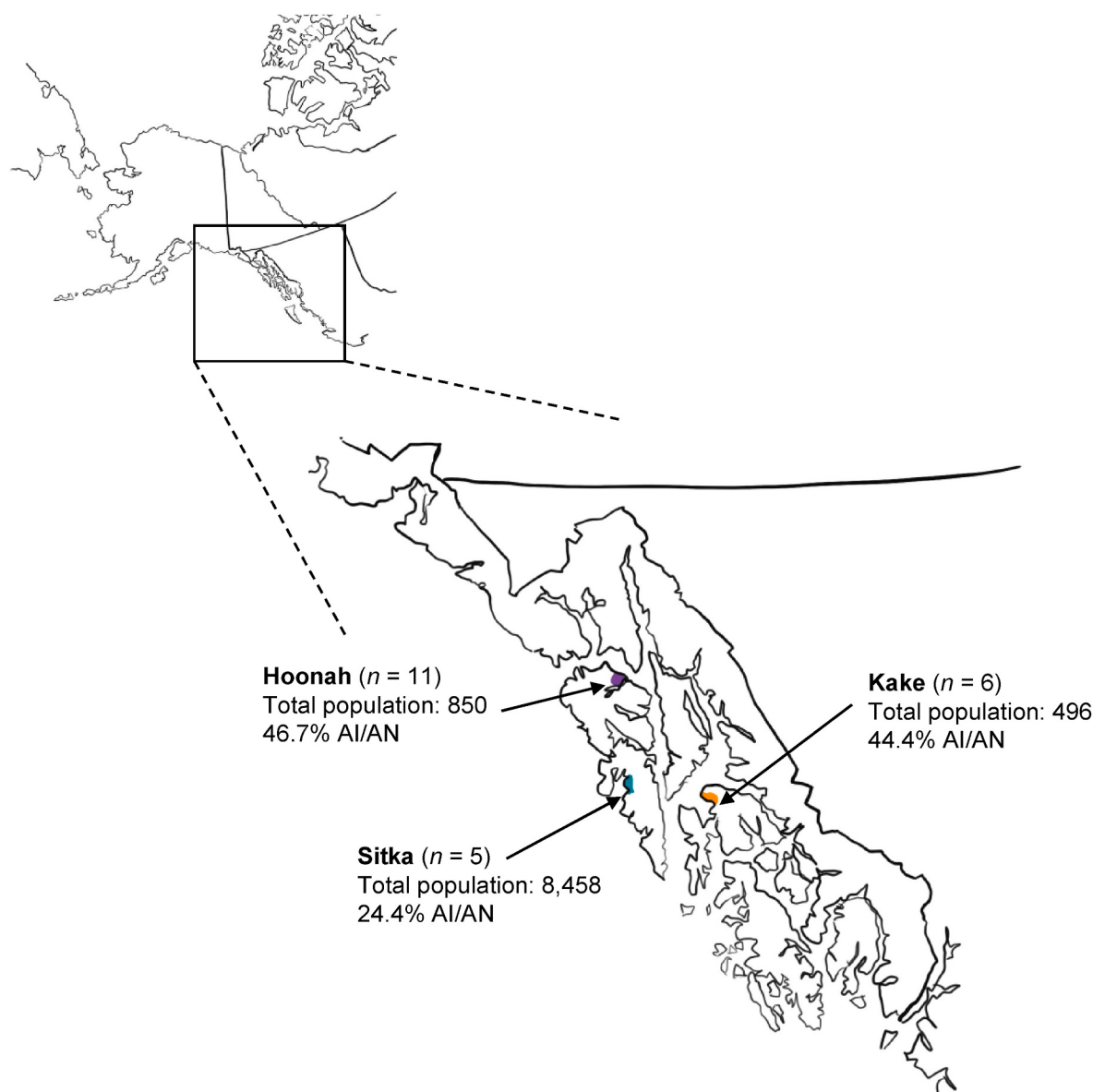


Fig. 1. Lingít Aaní (Southeast Alaska) relative to the rest of Alaska and western Canada. The four communities from which interviewees in this study hail and the number of interviews performed in each community are highlighted on the map: Hoonah (purple), Kake (yellow), and Sitka (green). For each locality, the total population and the percent of the total population that self-identified as “American Indian and Alaska Native (AI/AN) alone or in combination” on the 2020 U.S. Census are also reported. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

(aside from Tlingit, Haida, and Tsimshian, there are also: Athabascan; Siberian Yup'ik; Yup'ik, Cup'ik, and Yupiak; Iñupiaq; Alutiiq and Sugpiaq; Unangan; and Eyak), and at least 228 tribes that are complex and distinct in their social relationships and kinship with thousands of years of history tied to the land on which they live (Roderick, 2010; Williams, 2009). We examine socioeconomic and subsistence challenges, responses, personal and community health risk, and individual- and community-level behaviors in Alaska Native people across three island communities in response to the COVID-19 pandemic. This research will contribute to the knowledge of how people in remote rural communities, specifically those of Southeast Alaska, modify behaviors and exhibit resilience that is culturally grounded in the face of an acute infectious threat. A broader contribution of this research will be to elevate the importance of focusing in on the idiosyncratic knowledge, responses, and experiences of specific Indigenous populations to highlight their strengths rather than continue to make broad strokes generalizations about how Indigenous populations experience pandemics worldwide.

2. Methods

2.1. Overview & setting

The Sitka Sound Science Center (SSSC) partnered with the Central Council of Tlingit & Haida Indian Tribes of Alaska (CCTHITA) and the RAND Corporation to collect interview data surrounding COVID-19 perceptions in Southeast Alaska. SSSC is a community-based non-profit that is engaged in ecological education and research in Southeast Alaska, CCTHITA is a tribal government, and the RAND Corporation is a research non-profit heavily engaged in policy research and implementation. This paper is part of a larger research effort directed by this partnership to better understand the impacts of COVID-19 in Southeast Alaska; the interview data collected, analyzed, and reported here make up only one piece of the research program that will be discussed in future papers.

The first case of COVID-19 in Alaska was identified in Ketchikan, a town in Southeast Alaska, but the epidemic curve was relatively delayed compared to the continental U.S. and other Arctic nations (Alaska COVID-19 Information Hub; O'Malley, 2020; Petrov et al., 2020, 2021). The interviews collected in this study were performed in January through July of 2021, which was a period between waves of COVID-19 in Southeast Alaska; in July, Sitka experienced increasing cases per day without increasing hospitalizations or deaths (Alaska COVID-19 Information Hub). COVID-19 vaccines arrived in Juneau in mid-December 2020 and were quickly distributed to larger communities within Southeast Alaska (e.g., Sitka), who then helped with reaching smaller and more isolated communities (McKinstry et al., 2020). The state of Alaska, overall, has been praised in its ability to quickly vaccinate a large proportion of its population, especially Alaska Native individuals (Press, 2021), as Alaska had the highest per-capita vaccine rate in the U. S. by late January 2021 (Berman, 2021). Table 1 provides a summary of the new cases, hospitalizations, and deaths during this period, as well as a comparison to the total number of each measure for the entirety of the period for which data have been collected by the Alaska COVID-19 Information Hub (April 2020-present).

The region in which the study communities are located extends across 500 miles of coastline in the “panhandle” of Alaska, and includes several small, rural, and isolated island communities across the Alexander Archipelago on Tlingit, Haida, and Tsimshian land (Lingít Aaní) (Fig. 1). These communities rely on various traditional practices including some participation in traditional subsistence activities such as hunting (moose, caribou), fishing (salmon, shellfish), and gathering (berries, greens) (Redwood et al., 2008). This connection to the natural and marine environments further enhances the unique mechanisms through which acute and chronic stressors might impact community members and opportunities for equity.

2.2. Sample & recruitment

In-person interviews were conducted with 22 Alaska Native individuals across the four communities. One interview included a married couple, but the pair answered questions together and are represented as a single interview. All other interviews were with individuals. Interviews were performed with eleven individuals in Hoonah (Hoonah-Angoon Census Area), five individuals in Sitka (Sitka City and Borough), and six individuals in Kake (Prince of Wales-Hyder Census Area), summarized and identified on the map in Fig. 1. The populations of each borough, with the percentage of residents who identified as “American Indian and Alaska Native (AI/AN) alone or in combination” in the 2020 U.S. Census, are as follows: Sitka: 8458 people (24.4% AI/AN); Hoonah: 850 (46.7% AI/AN); Kake: 496 (44.4% AI/AN) (U.S. Census Bureau, 2020). Sitka, Hoonah, and Kake are all island communities; Sitka is the second largest city in Southeast Alaska after Juneau, and Hoonah and Kake are isolated and can only be accessed by plane or boat dependent on weather. These outlying island communities have seen considerable out-migration in recent decades, resulting in difficulty maintaining health, social services, and infrastructure, while Sitka is increasingly gentrified and experiences a large influx of tourism every summer (Safford et al., 2011; U.S. Census Bureau, 2010). In the small island communities, local access to food is of high importance since imported foods are limited and expensive; this is likely one of the main reasons why Alaska Native people in these communities are generally more concerned than non-Native people about environmental changes that compromise the natural resources on which they depend (Safford et al., 2011).

The COVID-19 pandemic yielded various restrictions in recruitment and participation, including stay-at-home orders and social distancing guidelines. Smaller, rural Alaska Native villages often operate through face-to-face contact, word-of-mouth, and physical gatherings, creating limitations to the adequate circulation of information about and participation in the study. Given these challenges, identifying participants and gathering interview data relied on a convenience sampling approach. CCTHITA organized interviews via contacts within specific Alaska Native communities (Hoonah, Sitka, and Kake). We recognize the bias introduced by convenience sampling, as the interviews were

Table 2

Summary of themes and sub-themes presented in results and discussed throughout the text. The number of respondents from each community, as well as the percentage of the total number of respondents from that community, are presented.

Major themes and topics discussed	Respondents by community		
	Sitka (%)	Hoonah (%)	Kake (%)
<i>Perception of Risk</i>			
Heightened concern for own health & vulnerable	4 (80)	7 (64)	5 (83)
Have not heard about 1918 influenza pandemic	2 (40)	5 (45)	1 (17)
Threat of climate change	0 (0)	8 (73)	5 (83)
<i>Socioeconomic, political, & community impacts</i>			
Worry about inability to meet essential needs	3 (60)	4 (36)	2 (33)
More trust in local vs. state/federal government	3 (60)	2 (18)	5 (83)
<i>Reacting to public health guidelines</i>			
Positive attitudes towards vaccines	4 (80)	8 (73)	6 (100)
Communities felt united	1 (20)	7 (64)	6 (100)
Communities felt divided	2 (40)	2 (18)	0 (0)
<i>Coping</i>			
Traditional knowledge essential for coping	5 (100)	11 (100)	6 (100)
Importance of access to subsistence foods	1 (20)	2 (18)	5 (83)
Physical gatherings are essential for coping	4 (80)	5 (45)	6 (100)

performed by local community members with other members of the community, and the interviews performed reflect “who knows whom.” This is neither a random sample, nor can it be considered generally reflective of Alaska Native opinions, attitudes, and behaviors. We do, however, consider it a strength that the interviews were conducted by Alaska Native people with their own community members, a fact that draws on the strong rapport already established between interviewer and interviewee.

Individuals were eligible to participate if they were 18 years of age or older and identified as Alaska Native. All interview procedures were approved by CCTHITA, SSSC, and RAND’s Human Subjects Protection Committee (Approval #2020–0320). Compensation for participation followed local Tribal protocols and guidelines specific to each village. All methods were developed in consultation with community stakeholders, in which interview protocols stemmed from the immediate concerns of the communities.

2.3. Data collection

CCTHITA representatives conducted structured interviews in English with Alaska Native individuals between January and July 2021. The interview protocol contained open-ended questions examining Alaska Native individuals’ perspectives surrounding traditional knowledge, threat perception, and adaptation in the context of COVID-19. Questions explored traditional, ecological, and historical knowledge, as well as engagement in cultural activities during the pandemic. Threat perception examined individual- and community-level risk perceptions, as well as vaccine trust and willingness to be vaccinated. Adaptation inquired into attitudes surrounding COVID-19 guidelines, trust in institutions, and community unity or division. No demographic or descriptive information is reported on interviewed individuals to avoid identifiability, per the IRB approval. Since these are small and highly connected communities, any descriptive information could easily inadvertently identify interviewees.

2.4. Data analysis

Discussions were held with interviewers periodically during the data collection process to ensure accurate understanding of findings and to assist with further context for data analyses. Interview transcripts were uploaded to [Dedoose \(2021\)](#), a qualitative analysis software program, and were independently coded within Dedoose by two coders (authors DZ and PG). The codebook was developed deductively prior to coding, as well as inductively during coding through discussion between coders. After completion of the thematic analyses, the interview material within the codes was reviewed and synthesized for concurring and opposing viewpoints on these topics. In total, 22 interviews were coded and organized into major themes.

Finally, within each of the major themes, we consider differences in responses between Sitka, the larger of the island communities, and Hoonah and Kake, which are small, remote, and have substantially larger Alaska Native populations. We report the number of respondents who addressed each topic presented in the results and provide a summary table that also includes the percent of respondents from each community who addressed each topic. We refrain from performing statistical analyses here given the relatively small sample size, but instead draw attention towards some meaningful patterns observed through this comparison.

3. Results

We identified four major realms through which we can discuss risk, impacts, and resilience as described by the 22 interviewees: (1) risk perception, (2) socioeconomic impacts, (3) reactions to public health guidelines, and (4) coping. These themes are broad, but together provide a foundation of knowledge of how the COVID-19 pandemic affected

rural Southeast Alaska Native communities. Each of these themes are discussed in turn. [Table 2](#) provides the summary of the total number of respondents and percent attribution to each community within the major themes.

3.1. Risk perception

Interviewees generally expressed the feeling that the threat of the COVID-19 pandemic led to prolonged stress. As one person from Sitka reflected:

... It was really the first time people became aware of their own mortality, and how fragile, and how precious life is. There’s not a lot of people that had given thought to, ‘well, I could die this year, or in a month or two’ ... What have I done with my life?

By the time the interviews in this study were performed (January through July 2021), people had begun to think more critically about how the threat of the pandemic would not only affect themselves, but their communities, especially in risk to Elders. Most ($n = 16$, 72.7%; four in Sitka, seven in Hoonah, five in Kake) interviewees expressed heightened concern for the health and wellbeing of vulnerable populations such as youth, Elders, unvaccinated, and unhoused individuals, with one respondent from Sitka stating: “If all the Elders die off, literally we’re stopped in our tracks.” In fact, interviewees identified Elder loss as a threat to the propagation of traditional knowledge, because this would effectively mean generations of lost knowledge that has not yet been passed to the younger generations. In this way, the threat of losing generations worth of knowledge, impacting how traditional knowledge is shared and experienced long-term, is a substantial ultimate threat to Southeast Alaska Native communities.

One facet of historical knowledge at risk of being lost through Elder loss is that of the last major pandemic: the 1918 influenza pandemic. While some interviewees ($n = 8$, 36.4%; two from Sitka, five from Hoonah, one from Kake) claim that they have not heard about the 1918 pandemic from Elders, others offered some insights into this event. One interviewee noted that out of 13 children, their great-grandfather was the only one to survive the flu. Another’s mother was only three in 1918 but remembers her grandmother burning sulfur to sanitize the house and protect it from the virus. Four interviewees described learning about how travel in Alaska was halted to help try to stop the spread of the pandemic, which worked, but ultimately ended up worsening the existing problems with lack of access to resources on the remote islands.

While there did seem to be a lack of consensus among interviewees about how they learned (or did not learn) about the 1918 influenza pandemic from community Elders, one interviewee from Sitka offered an explanation for why some may not have shared their knowledge: the early 20th century was a time of significant trauma apart from the pandemic, which included scooping of Native children, the persistent risk of deadly tuberculosis infection, war, and colonialism, all of which perpetuate intergenerational trauma. We acknowledge this barrier to sharing historical knowledge; despite this, one interviewee from Kake said people are still learning about the 1918 flu as a “motivator to take this one seriously, as a reminder of our communities’ resiliency.”

Acknowledgement of contemporary threats also help frame the ways Southeast Alaska Native people perceive the threat of the COVID-19 pandemic. Over half of the interviewees ($n = 13$, 59.1%; zero from Sitka, eight from Hoonah, five from Kake) mentioned the pressing threat of climate change to their communities. As their histories and cultures are intimately tied to the land on which they live and its natural resources, the threat of environmental degradation was identified as one of the primary adversaries to their current livelihoods, not necessarily the COVID-19 pandemic. One interviewee from Kake listed climate change, collapse of wild salmon runs, ocean acidification, loss of access to traditional foods and lands, dispossession of lands, continued clear cutting, and mining as threats that are regularly on their mind more than COVID-19.

3.2. Socioeconomic & political impacts

There was significant concern and fear of economic impacts throughout the Southeast Alaskan communities. Economic impacts include mass unemployment, in which COVID-19 had disproportionately affected certain industries such as tourism and local small businesses. One interviewee from Sitka described impacts on businesses and access to goods and services, especially those that had been interrupted from the lack of tourism:

I'm really concerned for our community in general, definitely the economic impact it had. We really rely on small businesses in our town, and it's just so sad to see some already closed down, or people having to rework what their plan was. And I don't ever want to turn into a ghost town where we have to find other sources of revenue.

Further, multiple interviewees ($n = 9$, 40.9%; three in Sitka, four in Hoonah, two in Kake) described the concern for an inability to meet essential needs. One in Sitka described impending fear with regards to affording necessities:

That's what I'm worried about in the next five years, how we're going to feel it financially. Especially in the rising cost of utilities: heat, electricity ... The minute the Governor said there was no state of emergency, and he took it off, all these people that had passed due utilities had to pay it within a day or come up with a payment plan. And mind you, people couldn't pay that for a whole year. So, all of a sudden you have this \$2,000 [payment] or else you have no electricity.

Almost half of the interviewees ($n = 10$, 45.5%; three in Sitka, two in Hoonah, five in Kake) expressed the inaccessibility of the state government and much deeper trust in local governments, highlighting the benefit of being able to see the inner workings of the decision-making process play out, knowing decision-makers personally, and understanding why some decisions are made regardless of differences in political opinion, which we will discuss further below. One interviewee from Kake mentioned how some state authorities attempted to ensure the Tribes were "on the ball" with mitigating risk, though the governor was trying to take credit for the success. Another interviewee from Kake also expressed frustration for the governor trying to take credit for vaccine rollout in the Native communities, while continuing to maintain "a nonchalant perspective of rural communities."

Finally, one of the major community impacts were the restrictions on transportation, which resulted in severe limitations to vital resources and travel. Ferry services and airplanes were seen as potential vulnerabilities in COVID-19 transmission. One participant from Sitka described the pivotal role of transportation and capacity to meet essential community needs given the geographic isolation of the Southeast Alaskan islands:

Transportation has always been a huge issue for Sitka—our barge service, our ferry service, and airport are a lifeline for the town. From outside medical care to provisions and things coming in, that system has been hit really hard. I'm curious to see how much of it will survive. Will the barges keep coming every week? Can they afford to? And the airlines keep flying like they do; can they afford to?

3.3. Reacting to public health guidelines

Interviewees described extensive efforts to adapt to COVID-19 guidelines for the sake of the greater community. One participant from Kake emphasized the importance of community-centered behaviors, not just those that benefit the individual: "I think everybody did their part, once they realized personal responsibility ... need to socially distance, wear a mask, wash hands, quarantine ... I'm proud of how responsible the community has been." However, there was some variance in attitudes regarding stricter and looser guidelines, leading to

some community division stemming from inconsistencies in guidelines and little accountability for those who did not obey. For those who provided detailed answers about how they perceived unity and division in their communities, one person in Sitka, seven in Hoonah, and six in Kake said they were united, while two in Sitka, two in Hoonah, and zero in Kake said there was division. Existing political division exacerbated by opposing COVID-19 perspectives furthered discord within the community, as one Sitka interviewee describes: "I still feel that tension between those who still want to wear masks ... more judgements and criticism ... It's easy to jump to conclusions, and I'm most worried about that division happening in our community post-COVID."

Most interviewees ($n = 18$, 81.8%; four in Sitka, eight in Hoonah, six in Kake) expressed endorsement, trust, and willingness to be vaccinated as an essential means to end the pandemic. Vaccination was described as a pivotal adaptation to returning to normalcy. In Sitka, one participant explained that they were no longer "nervous because people are instantly, like, 'I'm vaccinated. This is a safe space.' That makes me feel comfortable ... I'm no longer in a bubble." Another participant in Hoonah echoed this statement, explaining that the response to vaccines was very good in their community, and that when they finally hit around 74% vaccination coverage, they were "pretty close to the mark where they say the community should be safe."

Further, vaccination was described as a means to sustaining Native culture and values by one Sitka resident:

We're so connected, and it's hard when it's taken away. I miss hugs ... I can't go to funerals ... when somebody passes away the other Tribe takes care of everything, you put out all your *at.óow* (Tlingit for "prized possessions") and be there and hold up your family, your friends, or loved ones and you can't do that. I see people on the Tlingit & Haida Instagram and Facebook tying the vaccine to the culture: keeping each other safe by getting vaccinated ... It's a personal responsibility to keep our people safe.

The major drivers of these perspectives from interviewees were the willingness—and even enthusiasm—to be vaccinated out of concern for Elders, family, and other community members, referring to the fact that their Native traditions have always shown that looking out for one another is paramount to the survival of the group.

Despite the relative willingness to get the COVID-19 vaccine when it became available, a few interviewees (quotes from these individuals here) expressed distrust, skepticism, and reluctance to be vaccinated. One person in Sitka described their various concerns:

A lot of them root in conspiracy theories ... what's really in this, what is the goal of it, what are the repercussions of getting it? ... There's just so much unknown with it, which causes a lot of fear. I'm sure it works, but I didn't want to be one of the ones to get it first. I was also nursing, so I had a lot of fears around that ... I was definitely skeptical at first, especially coming from the government. They've never been able to do a vaccine rollout so quickly, once I researched how they did do it so quickly, that made me feel better.

There were also mixed perceptions on the vaccine mandates, with one individual in Hoonah stating: "It should be a choice, not a demand." Distrust of the government given historical discrimination and marginalization of Alaska Native communities was expressed as significant reason for reluctance, with one interviewee from Kake stating: "The older people have been through times where the government has done medical testing on them and their communities. Unfortunately, they are the largest demographic in Indian Country that doesn't wanna take it."

3.4. Coping

A pervasive sentiment of unity within the communities was described by interviewees as a primary method of coping with the effects of the COVID-19 pandemic. Individuals expressed consistent concern for the needs and safety of others, as one Hoonah community member

described: “I feel we are united ... there are so many people out wanting to help one another.” Another interviewee in Hoonah expressed similar sentiments, stating: “Hoonah is doing the better of all communities and keeping this from spreading,” although they also stated that the “tribe should have been more focused on getting supplies to the tribal members instead of ... building new buildings.”

All interviewees ($n = 22$, 100%; five in Sitka, eleven in Hoonah, six in Kake) described increased engagement and reliance on cultural traditions during the pandemic as an effective method of coping. One participant in Sitka described opportunities to engage with cultural traditions to serve the greater community:

I feel there's way more opportunities for us to do something traditionally: hunting and harvesting ... I went out and helped the Herring Protectors with the eggs, even though that's something we do every year ... If you think about it, it fed the whole town, and Southeast Alaska towns that can't go out and get their own branches. I think it's pretty cool that Tribes and communities are stepping up: How can we help each other?

Interviewees described resilience as embedded in Native culture and essential to the survival of generations, particularly through knowledge of available natural resources. Interviewees, primarily in the smaller communities of Hoonah and Kake ($n = 8$, 36.4%; one in Sitka, two in Hoonah, five in Kake) emphasize the importance of their knowledge and access to subsistence foods, both in fresh meats and greens, but also plants with medicinal properties like devil's club for flu-like symptoms and spruce needles for arthritis relief.

Traditional gathering and use of medicinal foods promote the sharing of generational knowledge and traditions, as well as connection to the environment. Subsistence and medicinal foods were critical to addressing economic burdens and reduced resources, as described by one interviewee in Hoonah: “We have knowledge about and how to utilize our land and the food. We know that if we do not have access to some foods, we can always have access to Native foods. Most endearing is everyone is willing to share.” Subsistence and medicinal foods are not withheld by a single household but are conserved and shared with the whole group. One participant in Sitka described sharing resources as engrained in Native culture and tradition, stating: “One of our core beliefs is never to take more than we need ... Native people have been living for tens of thousands of years in this land ... I don't only share food with Native people. I don't only share information with Native people.”

Changes in subsistence were found to have repercussions throughout generations and households given the interconnectedness of many Southeast Alaska Native families. Ability to meet basic needs were threatened, along with one's sense of purpose and identity. One interviewee in Hoonah describes the significant role of subsistence in connecting individuals to their environment, and the sense of responsibility to others:

To be honest it's been really tough ... [being] in nature is my religious experience. During the lockdown times not being allowed to be out hunting or traveling weighed heavy on me. As a son to a Native mother and grandson to Native parents it is my duty to provide deer, fish, shellfish, and so on every year, they depend on me for their food and health, this is a duty I take great honor in. Not being able to provide for them like I normally do feels like I let them down, like I am a failure.

Notably, there was a lack of physical gatherings and opportunities to share culture due to COVID-19 restrictions. Physical gatherings were expressed as essential to coping and passing on traditions, which were already threatened by risk of Elder loss ($n = 15$, 68.2%; four in Sitka, five in Hoonah, six in Kake). One person in Kake discussed how identity is shaped by gathering, and how that had been compromised over the course of the pandemic by saying: “Our connection, whether we're impacted or not, is the way we relate to all our gathering. Whether it's by family, multi-family, or community, we're able to gather and share

our knowledge. I know by the way it affected our culture camps that it really impacted us.” Finally, one interviewee in Sitka reflected on the pandemic and their vision of the coming years:

It feels like, looking back on this year (2021), a lot of things were stripped away from us ... Not being able to do certain things that really make our culture come to life. But I'm hoping that it puts the fire under everyone's ... priorities in life to keep the culture alive in whichever way they can.

4. Discussion

This study was motivated by concern of heightened vulnerability facing small Alaska communities, especially rural communities with relatively many Alaska Native people. Epidemiological research suggested that COVID-19 could overwhelm such communities and lead to high mortality and cultural disruption, partially due to loss of Elders. However, interview evidence indicated that small Southeast Alaska communities displayed considerable resilience and adaptive flexibility, relying on cultural history, identity, and practices to achieve internal psychological calm, and a sense of perspective, a coherent and (mostly) united sense of community, and protective behaviors.

The ways Southeast Alaska Native people perceived risks associated with the COVID-19 pandemic and for other prescient issues (e.g., the climate change crisis) were varied, especially between Sitka and the smaller towns of Hoonah and Kake. A large proportion of respondents from all three localities expressed concern about the health of themselves, Elders, family members, unvaccinated people, and unhoused people, but only respondents from Hoonah and Kake (Table 2: 73% and 83%, respectively) discussed the threats and effects of climate change. Because of the deep cultural connections to Native land over thousands of years, the rapid rates at which the environment and ecology of Southeast Alaska are changing may reasonably take precedent as the primary threat to Native way of life, especially in these smaller island communities that rely regularly on subsistence hunting and gathering. This speaks to the way individuals may triage crises and perceive relative threats, and more broadly to how the worldview of Southeast Alaska Native people influences how risks of the pandemic compare to other ecological risk. As presented in the results, the COVID-19 pandemic is indeed viewed as an immediate and significant danger, but it may also be true that the noticeably smaller glaciers, smaller salmon runs, and the loss of traditional subsistence opportunities represent similarly large or even greater obstacles.

In terms of the socioeconomic, political, and community impacts of the COVID-19 pandemic, there were slightly more respondents in Sitka who acknowledged that they were worried about their ability to meet basic needs during the pandemic (Table 2: 60% from Sitka compared to 36% and 33% in Hoonah and Kake, respectively). The essential needs discussed with respondents from Sitka were tied to threats to the tourism industry during the pandemic and the subsequent socioeconomic consequences, such as less income to pay rent and other bills. Throughout the pandemic, researchers observed that there are considerable socioeconomic consequences on rural communities (Henning-Smith, 2020; Mueller et al., 2021; Phillipson et al., 2020), and we acknowledge here that, based on these data, this is likely the case to some extent for the island communities of Southeast Alaska.

A key point for the context of rural communities in Southeast Alaska with substantial Alaska Native populations is the point about how the pandemic has caused shifting perspectives in local, state, and federal levels of governance. The mention of the governor of Alaska specifically, and by association the decisions of state-level government, are notable because Alaska Native people have also expressed that the actions of higher levels of governance are at odds with what rural communities want and need (Shearer, 2007). Levels of government above the local (e.g., state and federal) make decisions that impact more people, and the needs of small, remote, rural communities can become overshadowed

with those of the larger population. The socioeconomic and political risks to small rural communities, especially those with relatively large Indigenous populations, are driven by macrosocial forces that cannot be divorced from their microsocial impacts, especially those related to health and influence social inequalities (Farmer, 2004). Negative impacts on financial security and community cohesion, particularly as influenced by polarization in attitudes towards public health guidelines, are high-level agents of perpetuating social inequalities (Krieger, 1994), and could have long-lasting socioeconomic and health consequences.

In response to these drivers, interviewees discussed how they organized themselves and worked with community-centered Native organizations to mitigate the negative influences of national- and state-level public health messages. The organizations that were most helpful in connecting with the immediate socioeconomic needs of these rural communities were the Southeast Alaska Regional Health Consortium, CCTHITA, and the Hoonah Indian Association. Leaning on one another and these organizations, which are often made up of members of the communities they serve, was an essential behavior to mitigate the effects of the pandemic.

Most of the interviewees in this study expressed willingness and enthusiasm about access to the COVID-19 vaccines when they became available (Table 2: 80% in Sitka, 73% in Hoonah, 100% in Kake). Alaska Native people have successfully leveraged community and cultural ties to promote resilience, particularly in the context of vaccination. Despite barriers facing their communities such as constraints in healthcare access, remoteness, and higher COVID-19 infection rates, American Indian and Alaska Native peoples have attained leading vaccination rates against COVID-19 in the U.S. (Foxworth et al., 2021; Haroz et al., 2022). The attitudes that frame vaccination against COVID-19 as a social responsibility and a compelling way to approach the end of the pandemic are in stark contrast to the attitudes of non-Native populations, particularly in the lower 48 (Gerretson et al., 2021). Recent studies suggest adults in the U.S. are more likely to perceive public health messages about vaccination positively if they have individualist versus collectivist messages (Borah et al., 2021; Yuan and Chu, 2022).

This contrast helps elevate the importance of community- and culture-centered approaches to navigating crises in remote and rural Southeast Alaska Native groups. Smaller units of self-governance and autonomy in vaccine decision-making among Alaska Native people have proven to be largely effective in influencing whether to be vaccinated or not, per the interview data. In-depth qualitative interviews with remote Alaska residents reveal that opinions, decision-making, and actions surrounding the COVID-19 vaccines are complex and must involve consistent and clear messaging, trust, and community support (Eichelberger et al., 2022). Recent research using data from all regions of Alaska to explain dynamic attitudes about COVID-19 vaccines show that despite initial hesitancy, over half expressed acceptance of vaccines in winter 2020, and eventually over 80% expressed that they would get the booster, as well (Hahn et al., 2022). In Alaska, state public health agencies partnered with Tribal leadership throughout all stages of vaccine distribution to recognize historical and present-day mistrust and marginalization between Tribal communities and states (Chhean et al., 2021; Sanchez and Foxworth, 2021). Messaging about vaccinations and other state or federally imposed guidelines that highlighted cultural protection and concern for well-being of loved ones were found to be more successful (Sanchez and Foxworth, 2021), parallel to the findings in this study.

The public health messaging that comes from these governmental authorities also sowed distrust in those authorities, as well as community division along political lines. While very few interviewees in Hoonah and Kake expressed feelings of division (Table 2: 18% in Hoonah, 0% in Kake), 40% of interviewees in Sitka said they felt strong political division within their communities; conversely, 64% of Hoonah respondents and 100% of Kake respondents reported the perception of community unity, while only 20% of Sitka respondents reported similarly. This strongly echoes the sentiments discussed above regarding

state- and federal-level government decisions and their socioeconomic and community impacts, specifically the disconnect between the intention and the reality of political decisions that instill distrust in Native communities, and inadvertently towards each other. It also highlights the important points that although these communities generally have strong methods for community-centered adaptation, biomedical interventions like vaccinations remain contentious issues.

Finally, the results show that connection to traditional knowledge and community were essential for coping with the COVID-19 pandemic. Every respondent from each locality discussed how community-centered, rather than individual-centered, attitudes and care helped keep people connected to ensure sharing of traditional knowledge could continue. As discussed above, the willingness and enthusiasm for the COVID-19 vaccines were not so much in the interest of individual protection, but as a means of returning to gatherings. Throughout the paper, the main through lines of the results before the explicit presentation and discussion of coping—and therefore resilience—have been about traditional knowledge, whether it was about the 1918 influenza pandemic, access to subsistence foods, connections to the environment, or motivations for community health rather than individual benefits. The values that the Alaska Native respondents discussed kept them grounded through the year of the pandemic before widespread vaccine usage allowed them to return to a version of “normal” that allowed them to mitigate the adversity faced while apart.

The successful efforts of community and cultural resilience discussed by Alaska Native people may be applied and tailored to similar communities with regards to attitudes about vaccines and similar COVID-19 impacts. They may further be applied to community-level pandemic preparedness plans, so that adaptation is more seamless. Findings in this study highlight how priorities differ (or do not differ) among different island communities of Southeast Alaska, as roles and influence of social bonds and institutions are distinctly influential. It is critical to remember, however, that the need for resilience in Indigenous communities often stems from the impacts of long colonial histories and marginalization. Future work should continue to challenge the root causes for the needs of resilience in Alaska Native communities to better understand risk perception and coping.

4.1. Limitations

This study has several limitations. First, interviews were conducted during a period of the pandemic in which COVID-19-related guidelines and knowledge were rapidly evolving, so sentiments expressed about adaptiveness were in response to ongoing changes. Further, the study was funded by a rapid-response grant, limiting resources and scope of the study. Interview samples were not random samples, limiting the generalizability of findings for Alaska Native people, which we have reflected upon in the Methods section. Despite this, there are 228 federally recognized Alaska Native tribes; therefore, the findings specific to a few towns in Southeast Alaska reported here should not be considered applicable to Alaska as a whole. Additionally, the findings of this research serve to provide a foundation of understanding Alaska Native perspectives and resilience strategies in the face of the COVID-19 pandemic, so small-scale, focused interviews specific to these island communities were appropriate.

5. Conclusion

An emergency response model of resilience prioritizing Indigenous perspectives acknowledges the differentiating contexts and adaptive behaviors that occurred in response to the COVID-19 pandemic. Indigenous knowledge and practices are critical to promoting social cohesion, resilience, and survival of global Indigenous communities (Kirmayer et al., 2011). Past research has explored response capacities of global Indigenous communities in various emergency settings, but these responses have often neglected to incorporate and uphold Indigenous

knowledge, resulting in unsustainable responses and limited self-determination of Indigenous people (Howitt et al., 2012). Southeast Alaska Native coping strategies demonstrate culturally relevant coping mechanisms that serve to strengthen internal cultural ties as well as larger scope solidarity.

Credit author statement

Taylor P. van Doren: Formal analysis, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization; **Deborah Zajdman:** Formal analysis, Data curation, Writing – Original Draft; **Ryan A. Brown:** Conceptualization, Writing – Review & Editing, Supervision, Funding Acquisition; **Priya Gandhi:** Formal analysis, Data curation, Writing – Original Draft; **Ron Heintz:** Conceptualization, Writing – Review & Editing, Supervision, Funding Acquisition; **Lisa Busch:** Conceptualization, Writing – Review & Editing, Supervision, Funding Acquisition; **Callie Simmons:** Data Curation, Writing – Review & Editing; **Raymond Paddock:** Conceptualization, Methodology, Investigation, Data Curation, Writing – Review & Editing, Supervision, Project Administration, Funding Acquisition.

Data availability

The data that has been used is confidential.

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