The state of research focused on COVID-19 in the Arctic: A meta-analysis

Jennifer Spence & Sai Sneha Venkata Krishnan

The Arctic region faces unique risks and challenges as a result of both the COVID-19 pandemic and the actions taken to respond to it. Arctic communities have distinct health, social and economic needs and circumstances that were more pronounced during this pandemic. Research offers an important opportunity to understand the region's unique conditions and characteristics for pandemic management. *Only by systematically examining its impacts can public officials, community leaders, medical professionals and other decision-makers have the knowledge needed to decrease further harm due to COVID-19 and leverage this opportunity to support the resilience of Arctic communities. This article contributes to this knowledge building effort by surveying the literature (peer reviewed and grey) that explicitly focuses on COVID-19 in the Arctic between 2020 and 2022. We analyze this emerging body of work with a focus on identifying overarching trends (time, countries studied, scale of analysis, specific populations). We also map the themes and topics considered in this literature with a focus on highlighting topics that are prominent and those that are conspicuously underrepresented. This analysis seeks to inform our understanding of, and response to, the pandemic and other global shocks in the short-, medium- and longer-term.*

Introduction

On 11 March 2020, the World Health Organization (WHO) declared the spread of novel coronavirus (COVID-19) to be a global pandemic (WHO, 2020b). In the following months, this infectious disease spread rapidly and reached all regions of the globe at a pace unprecedented in human history. The COVID-19 pandemic represents a rapid global shock that has severely disruptive consequences (OECD, 2011). However, while the presence of COVID-19 has been pervasive, people's experiences with the pandemic have been diverse. As a consequence, there is an emerging literature that explores the varying impacts of the pandemic on different countries, industries, socioeconomic statuses, age groups, genders, etc. This research is critical not only to understand the differentiated impacts of the pandemic, but to examine the broader systemic and

Jennifer Spence, Senior Fellow, Belfer Center Arctic Initiative, Harvard Kennedy School
Sai Sneha Venkata Krishnan, Researcher, Belfer Center Arctic Initiative, Harvard Kennedy School

structural biases within our societies. Lessons and insights learned from the pandemic offer an opportunity to inform our actions to effectively break down barriers and build resilience.

In June 2020, a preliminary assessment of the impacts of COVID-19 in the Arctic and the actions taken to respond to the pandemic was released by the Arctic Council (2020) in a briefing document prepared for Senior Arctic OfficialsClick or tap here to enter text.. This report, released early in the pandemic, was produced using available material and data; however, given the short timeframe, gaps in information, and the evolving circumstances, the report recommended that additional research would be needed.

Research to examine the experiences of Arctic residents and communities with COVID-19 offers an important opportunity to understand the region's unique conditions and characteristics for pandemic management. It also helps in advancing our understanding of the specific impacts and lessons learned from the spread of COVID-19 and related public health responses in the Arctic. This article surveys this new literature focused on COVID-19 in the Arctic. Through this form of meta-analysis, we contribute to building our region-specific knowledge by examining where research is taking place and the common themes and issues that have been explored regarding COVID-19 in the Arctic.

The goal of this article is to raise awareness among researchers and decision-makers and deepen their understanding of the responses to and impacts of COVID-19 in the Arctic. This analysis provides the Arctic research community with opportunities to examine common themes and identify research synergies. It also highlights areas with limited research and invites experts and knowledge holders to reflect on why these gaps exist and to what extent this analysis could inform future research priorities. Furthermore, we aim to provide an overview of this emerging literature for decision-makers – those responsible for future policy actions in the Arctic at every scale. We seek to demonstrate that research related to COVID-19 in the Arctic provides decision-makers with important resources that can contribute to evidence-based actions that advance the resilience of Arctic communities in the face of a pandemic and other major shocks, including climate change, geopolitical crises, and massive socio-economic pressures.

This article begins by providing an overview of the methodology used to conduct a meta-analysis of the literature focused on COVID-19 in the Arctic. We then present key findings from this analysis. We begin by analyzing the overarching trends in this emerging literature over time, geography, scale of analysis, and key populations. We subsequently examine the issues and themes identified in this literature using three broad categories: *pandemic spread and public health responses*, *pandemic consequences*, and *lessons for the future.*

Methodology

There are different types of meta-analysis that serve different purposes and, by extension, depend on different methodological approaches (Levitt, 2018). This research project aims to provide a descriptive overview of an emerging body of literature that focuses on the impacts of COVID-19 in the Arctic. Data collection and analysis procedures for this form of meta-analysis were designed with this aim in mind. Data collection involved a broad search of source materials. Google Scholar was used to create an initial list of source materials published between January 2020 and December 2022. Search teams used were: "COVID-19", "pandemic", and "Arctic". As we intended to include all relevant materials, this search included all publications with these search terms anywhere in the article and included any type of publication included in the Google Scholar database (peer reviewed, grey, citations). The search was limited to English language search results. We recognize that the search engine, search terms, focus on English search results, and a manual review of the dataset would not capture all the work that contributes to this emerging body of literature or produce a comprehensive dataset. Additional research will improve our understanding of this literature, but

the findings presented in this preliminary survey of the literature confirms the value of efforts to examine and understand research taking place in this space.

The Google Scholar search produced 17,100 sources. An initial review of these sources, based on titles, removed a substantial number of duplicates. A second phase of review culled sources using the title and abstract (if available) to exclude sources based on their relevance. In particular, we excluded sources where COVID-19 was not a core component of the article. This included source materials that only mentioned COVID-19 in passing or peripherally. Additionally, we excluded articles that did not differentiate Arctic and non-Arctic regions within the countries being studied. Given the purpose of this meta-analysis and the emerging nature of this body of literature, we decided not to limit the dataset to peer-reviewed sources. However, we did exclude sources that provided no substantiated information or analysis (e.g. editorials, commentaries, project descriptions, etc.). After this initial filtering, the dataset included 171 sources. We then conducted a more comprehensive assessment of these sources and excluded an additional 52 sources based on specific criteria, which included 1) not substantially focused on COVID-19 (26), 2) not substantially focused on the Arctic (16), and 3) not able to locate the publication for analysis (10). The resulting dataset includes 114 sources.

The data analysis procedures associated with this review were similarly designed to align with the goals of this research. We focussed on mapping the source materials into broad categories and specific topics of study. This enabled us to observe patterns in this emerging literature. We did not attempt to analyze the findings in the source materials or assess their quality.

We adopted a hybrid approach to structuring our mapping and categorization of the source materials. The initial structure used to classify source materials was based on the broad categories and specific topics/issues introduced in the Arctic Council assessment report (2020). This initial analytical structure was a useful guide for the meta-analysis because it was developed at the beginning of the pandemic by over 50 Arctic experts with a diverse range of expertise and interests. These Arctic experts developed this initial frame with the intention of articulating the types of information and knowledge that could be important to guide research and policy making. The categories and topics identified in this report are outline in Table 1.

Table 1: Arctic Council COVID-19 Assessment Report categories and topics (2020)

Category	Topic
Existing Public Health Actions and Activities Across the Circumpolar Arctic	Available epidemiological data
	Infectious disease monitoring and assessment
	Patient care
	Public health information sharing, awareness, and education
	Risk management and mitigation
Consequences of Pandemic and Public Health Responses	Physical well-being and mental health
	Regional and local economies by sector/industry
	Social and cultural environments
	Vulnerable persons
	Knowledge production
	Mobility
	Enabling public infrastructure

In addition to mapping articles using these predefined categories and topics, we remained open to including additional categories and topics that emerged from the dataset. Using this flexible approach, we included one additional category, "*Lessons for the future*", and seven new topics. In the *pandemic spread and responses* category, we included the topics: *access to relevant health data* and *community and culturally grounded responses*. In the category of *pandemic consequences*, we identified five new topics: *environment/climate, food security/sovereignty, community-level impacts, political impacts, and geopolitical impacts*. In analyzing the dataset, we also made the decision to move the topic of *enabling infrastructure* to the *pandemic spread and responses* and *lessons for the future* categories because we found that the literature was primarily focused on to what extent the physical and social infrastructure was sufficient to support pandemic responses rather than providing commentary on the consequences of the pandemic. The final list of categories and topics used for this meta-analysis is presented in Table 2.

Table 2: Categories and topics used for analysis

Category	Topic
Pandemic Spread and Responses	Available epidemiological data
	NEW: Access to relevant of health data
	Infectious disease monitoring and assessment
	Patient care
	Public health information sharing, awareness, and education
	Risk management and mitigation
	NEW: community and culturally grounded responses
	Enabling public infrastructure [moved from pandemic consequences]
Pandemic Consequences	Impacts on physical well-being and mental health
	Impacts on regional and local economies by sector/industry
	Impacts on social and cultural environments
	Impacts on vulnerable persons
	Impacts on knowledge production
	Impacts on mobility
	NEW: impact on environment/climate
	NEW: impact on food security/sovereignty
	NEW: community-level impacts
	NEW: political impacts
	NEW: geopolitical impacts
Lessons for the Future	Enabling public infrastructure [moved from pandemic consequences]
	Other

Source materials were analyzed for their inclusion in all relevant categories and topics. For example, one source might include content relevant to the *pandemic spread and responses* category and the *pandemic consequences* category. Similarly, a source could cover multiple topics, such as *risk management and mitigation*, *impact on regional and local economies*, and *impacts on mobility*. In addition to these categories and topics, the source material was analyzed for the countries covered (Canada, Kingdom of Denmark, Finland, Iceland, Norway, Russia, Sweden, United States), the scale of analysis (local, sub-national, national, sub-regional, pan-Arctic, global), and specific population lenses (Indigenous Peoples, vulnerable persons, gender).

Findings: Overarching trends

The dataset of 114 sources provides us with some rich insights regarding the emerging literature focused on COVID-19 in the Arctic.[1] We will start by reviewing some of the overarching observations about this body of work and then examine specific findings regarding the themes and issues addressed.

Research over time

The articles analyzed were published from January 2020 to December 2022. Figure 1 demonstrates that researchers interested in studying COVID-19 in the Arctic responded quickly. Two grey literature products were released almost immediately after the pandemic was confirmed in March 2020 – one article focused on the impact of travel restrictions in Norway on Arctic research (Vogel, 2020), and one policy brief focused on Inuit Nunangat that emphasized the importance of Northern research related to the pandemic and Inuit perspectives and experiences (Penney & Johnson-Castle, 2020). Furthermore, the first peer reviewed article was published shortly after in April 2020 and considered the impacts of COVID-19, public health responses, and travel bans on the relationship between Greenland and Denmark (Grydehøj et al., 2020).

Figure 1: Number of articles published from January 2020 to December 2022

The number of publications grew throughout 2020 and again in 2021 with publications peaking in the summer of 2021. Following mid-2021, we observe a decline in the literature being published in this space. In fact, publications from 2022 make up only 24% of the total dataset whereas 2021 saw approximately 50% of sources published. While this decline in publications is perhaps consistent with general "pandemic fatigue" observed globally (World Health Organization, 2020a), the timing of this decline seems premature to build a solid base of knowledge in this field. It should be of concern for those who recognize the importance of short-, medium- and longer-term research and analysis of such an important global event, especially in the Arctic.

Arctic State coverage

This meta-analysis provides us with useful insights about the geographic areas that have been the focus of study in this literature. What stands out in Figure 2 is that the Russian Arctic (33%) followed by Norway (25%) and Canada (25%) are the most studied in the dataset. Whereas, Iceland has been least studied in this literature (11%). It is difficult to come to any conclusions about why we observe these variations in the geographic areas studied. The strong presence of the Russian Arctic in this literature at the very least indicates a clear interest by researchers in understanding the unique conditions, characteristics, and consequences of pandemic management in the Russian Arctic, especially when you consider that data collection was conducted in English. However, the

---

[1] More detailed information about the dataset is available upon request by contacting Jennifer Spence.

weaker showing of Iceland in this dataset may not fairly represent the production of relevant research and may be more an indication that "Arctic" is not an appropriate search term for identifying Arctic-relevant research related to the pandemic in Iceland.
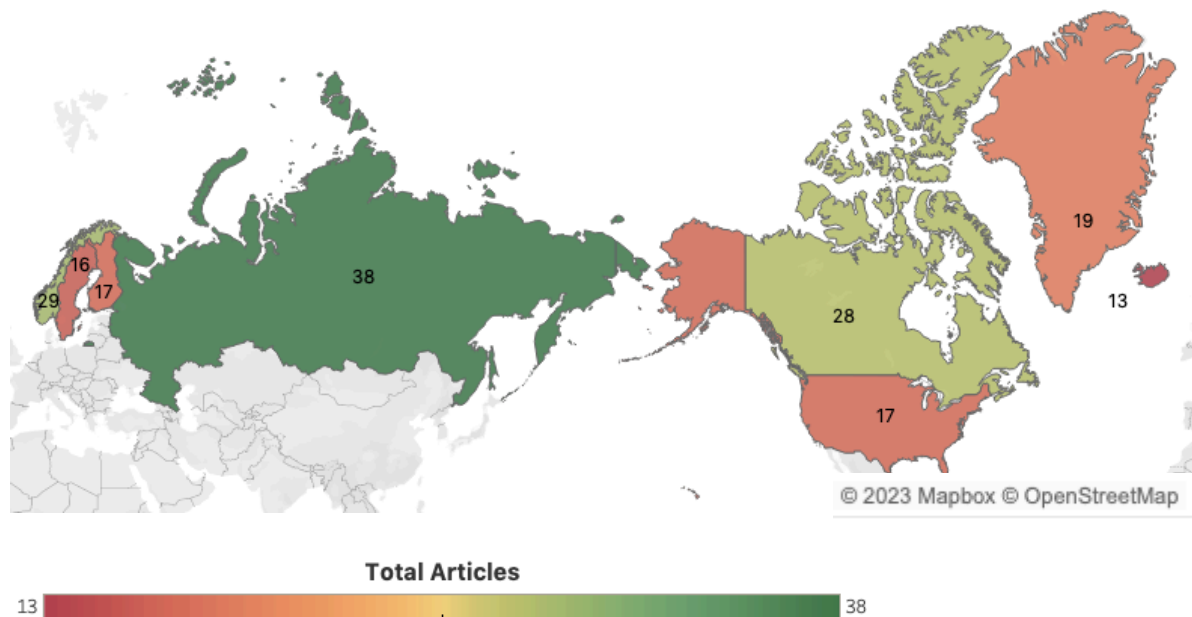

Figure 2: Number of articles covering each Arctic State

Scale of analysis

Our study also considers the scale of the analysis used in the source materials (local, sub-national, national, sub-regional, pan-Arctic, global). 48% of publications in the dataset focused on the sub-national level (e.g. Yukon, Yakutia, Alaska). This finding is perhaps not surprising given the scale at which the pandemic is most effectively understood and managed. Perhaps more surprisingly, the pan-Arctic scale of analysis was the next most frequently adopted (35%). Source materials in this category generally fell into three categories: impacts on Arctic governance, Arctic science, and the Arctic environment. Recognizing that we may be observing a bias in the dataset caused by the search terms adopted for this study, it is interesting and validating to observe the Arctic being used as a unit of analysis for understanding the impacts of a pandemic. Lastly, local (i.e. community-centred) and sub-regional (i.e. various sub-groupings of Arctic states) scales of analysis took up similar shares at 16% and 17%, and national- and global-level studies that substantively considered the Arctic were lowest at 9% and 12% respectively.

This analysis is further nuanced when we combine the Arctic state coverage with the scale of analysis used (Figure 3). We observe three interesting findings. First, 55% of sources that included the Russian Arctic used the sub-national level as the unit of analysis, and on the flipside, 44% of the research done at the sub-national level focuses on the Russian Arctic. This finding reinforces the research interest and capacity that is dedicated to studying the Russian Arctic. It also suggests that the specific context and experience of the Russian Arctic during the pandemic is seen as an important area of research. Next, we observe that 32% of all source materials that included the Canadian Arctic focused on a local scale of analysis, and 56% of the local-level research involved communities in the Canadian Arctic. No solid conclusions can be made about the reasons for this result. This finding may be driven by the types of research interests that are relevant in the Canadian Arctic, but it also may provide evidence that the community-based research approaches that have been championed in the Canadian North are taking hold. Lastly, it is interesting to observe that none of the publications in the dataset adopted the Nordic region as a unit for analysis. The absence

of this form of sub-regional research is notable given the potential common experience, and opportunities for comparison and shared lessons learned. It is also interesting because of the existence of Nordic research funding programs that could easily enable this form of sub-regional collaboration if there was interest.
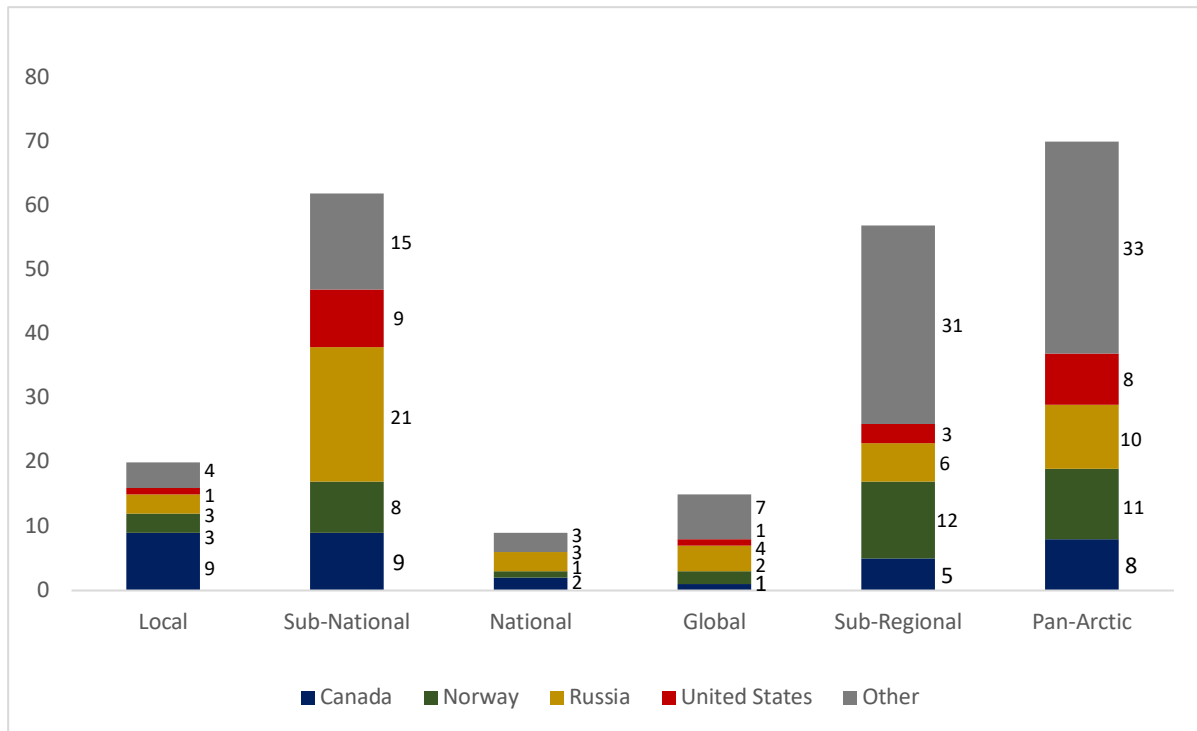

Figure 3: Articles by country across scales (local to global)

Population lenses

Finally, we analyzed the dataset using specific population lenses that are relevant in the Arctic context: Indigenous Peoples, vulnerable persons, and gender. Our first finding is that 37% of publications in the dataset focused on or provided an Indigenous perspective on the impacts of the pandemic in the Arctic. 38% of these publications include a focus on the Canadian Arctic and 57% of the publications that study the Canadian Arctic incorporate Indigenous issues and/or perspectives. Also notable, 90% of the publications that focused on the Canadian Arctic at the local level include Indigenous perspectives and experiences. This finding is particularly interesting when we recall that Canada had the largest share of locally focused research, which may provide some insights on the types of research related to the pandemic that are more relevant to Arctic Indigenous Peoples in Canada.

Research related to the impact of the pandemic on vulnerable populations was identified in only 16% of the literature. These publications covered a broad range of issues, including older populations, mental health, remote communities, food security, and human rights. No one Arctic state stands out as being the focus of this research, rather the scale of analysis is more interesting. Half of the articles focused on vulnerable populations adopted a sub-national level of analysis, which again is likely appropriate given the level at which public health responses are most actively managed. Pan-Arctic studies represented 28% of the publications that highlighted the experiences of vulnerable populations. This observation may provide guidance regarding an area where future Arctic-focused research could be valuable.

Lastly, work incorporating a gender lens or issues into research related to COVID-19 in the Arctic was notably low in the dataset. Some consideration of gender was included in only 6% of

publications and in none of these was gender a primary focus. This emphasizes the importance of projects, such as Understanding the Gendered Impacts of COVID-19 in the Arctic (George Washington University, n.d.), that dedicate specific attention to important area of research. Initiatives like this will hopefully share analyses that will help to fill this gap in the literature.

Findings: Themes and issues

The broad categories (*pandemic spread and responses, pandemic consequences, lessons for the future*) used to structure this meta-analysis provide a frame to analyze the dataset and present relevant themes that are covered in the literature. 45% of publications include a focus on understanding *pandemic spread and responses*, articles that analyzed the *pandemic consequences* represent 68% of the dataset, and 40% of the articles incorporate *lessons for the future*. Figure 4 provides us with an overview of the prominence of publications in each of these categories over time. We observe that, while the largest number of articles focused on understanding *COVID-19 spread and responses* were published in 2021, this category represented the largest share of articles (52%) in 2020. We also observe that research related to the *consequences of the pandemic* assumes the largest share in all years and follows a similar trend.

As outlined in the methodology section, we subsequently included a third category for analyzing the publications. We were interested in capturing those source materials that offered *lessons for the future*. We thought it could be useful to acknowledge the portion of this emerging literature that provides insights for researchers and practitioners that could inform further action. What we observe is that 40% of the dataset (with a relatively consistent proportion of publication each year) provide some future-oriented insights.
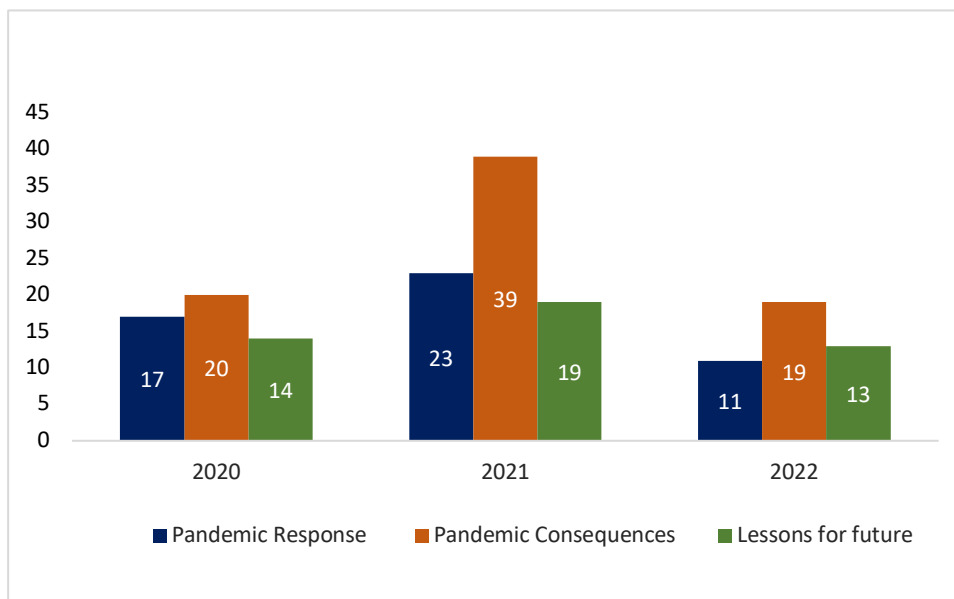

Figure 4: Number of articles by category from 2020-2022

There are two additional observations worth noting about the placement of these source materials into these higher-level categories. A notable percentage of articles in all three categories include Indigenous issues and/or perspectives. Articles in the *pandemic response* category had the highest share of articles (50%), while the *pandemic consequences* and *lessons for future* categories included 36% and 40% of articles respectively. This helps to substantiate the narrative that Indigenous Peoples hold a prominent position in the Arctic and emphasizes that research that includes Indigenous perspectives and interests is treated as a priority. A second observation is that sub-national analyses make up the largest share of all of these categories, and they also form the most consistent share of each (pandemic response 41%, pandemic consequences 41%, lessons for the future 32%). The reasons for, and consequences of, this finding are beyond the scope of this article; however,

considering the strength and diversity of research at this scale and others warrants further consideration.

Pandemic spread and response

As previously mentioned, the topics identified to classify the literature were initially drawn from the Arctic Council's assessment report (2020) released early in the pandemic. In our analysis of the dataset, we identified two additional topics: *access to relevant health data* and *community and culturally grounded responses*. We also included the topic of *enabling public infrastructure* in this category rather than in the *pandemic consequences* category because it was a more appropriate fit given the focus of the publications analyzed.

In classifying the source materials, it is perhaps not surprising to observe in Figure 5 that the largest number of articles focus on risk management and mitigation (36%). It is also interesting that close to 80% of publications in this topic area were released in 2020 and 2021 and only 20% had this focus in 2022. These articles covered a broad range of topics (e.g. public health measures, travel bans, food security, fisheries, etc.). This literature provides important insights about the unique characteristics of pandemic management in different Arctic contexts and informative accounts of the context-specific experience of implementing risk management measures in the Arctic.
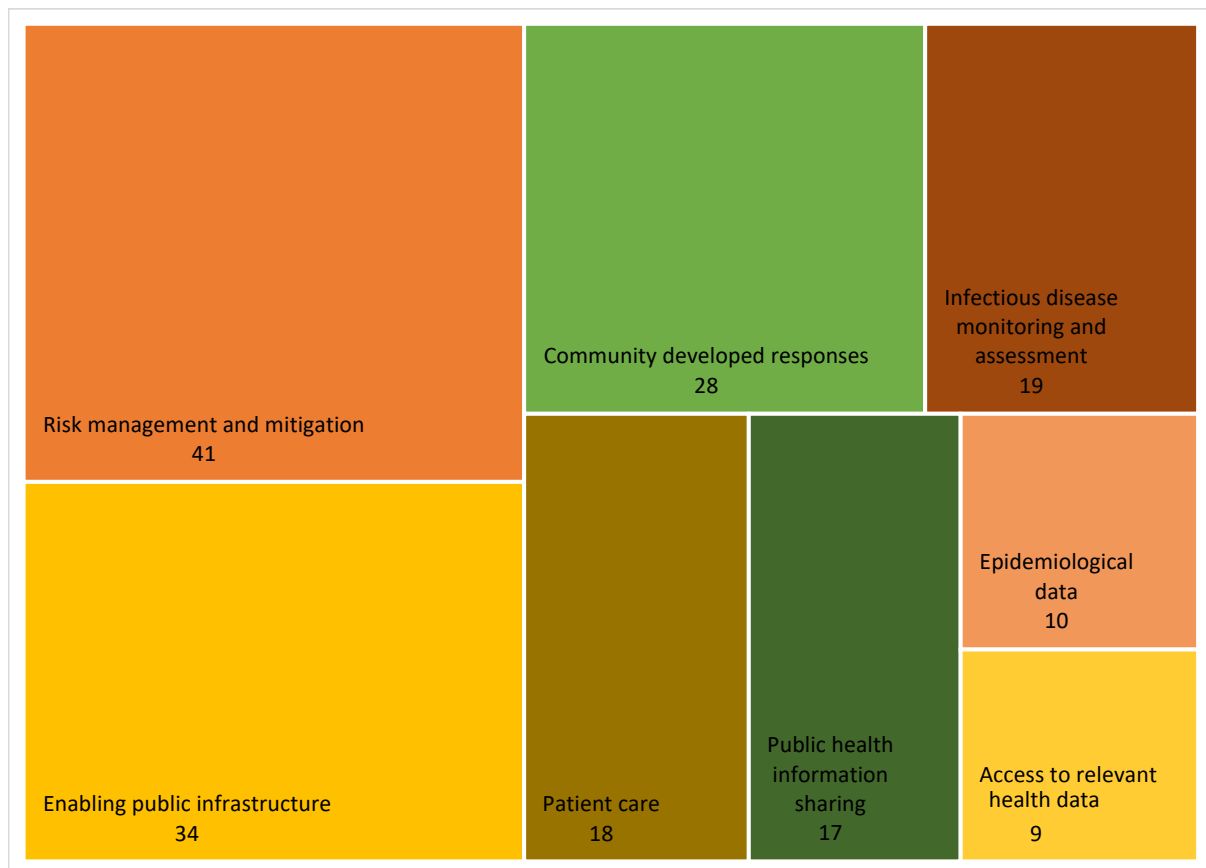

Figure 5: Topics under *Pandemic Spread and Response*

The topic of enabling infrastructure also received a significant amount of attention in the publications studied (30%). In Penny and Johnson-Castle's (2020) early analysis of the risks of COVID-19 in the Inuit Nunangat, they signalled that the pandemic would make the infrastructure gaps faced by Inuit "even starker" (p.3). The subsequent publications in this dataset confirm the diversity of issues related to physical and social infrastructure risks and challenges. Articles covered a range of topics: health-related equipment and supplies, housing, internet connectivity, food supply chains, emergency response, and access to social services. In many ways, the pandemic

provided concrete and vivid illustrations of the infrastructure gaps that Arctic communities have raised concerns about for decades (Arctic Council, 2020; Nunavut Tunngavik, 2020).

The newly added topic of *community and culturally grounded responses* also held a prominent place in the literature (25%). This topic included a diverse range of issues and experiences that provided an interesting counterpoint to the infrastructure challenges articulated above. In addition to emphasizing the importance of community-driven responses to the pandemic, articles highlighted the strength and resilience of Arctic communities in the face of the pandemic, such as the importance of country foods and food sharing systems, on-the-land initiatives, and social and cultural support systems.

Of equal importance in this analysis are the topics that received limited attention. Experts in the initial Arctic Council report emphasized the critical importance of reliable, high quality epidemiological data to understand the spread of COVID-19 in the Arctic and respond to and mitigate health risks. They also acknowledged that this type of data is often not easily accessible in many Arctic jurisdictions (2020). The University of Northern Iowa Arctic COVID-19 project provides an interesting example of efforts to collect and analyze Arctic-specific data about COVID-19 cases and deaths using accessible data sources (University of Northern Iowa, n.d.). It illustrates the value of dedicated efforts to collect, organize and analyze data that can strengthen our understanding of the Arctic context and inform appropriate responses. However, the limited number of publications identified under this topic (13%) and under the newly added *collection of health data* topic (8%) suggests that there is much more work that can be done to empirically assess the spread of COVID-19, the pandemic response, and the pandemic consequences in the Arctic.

Pandemic consequences

In the category *pandemic consequences*, we also started with the topics identified in the Arctic Council report, and as previously mentioned, incorporated five new topics based on issues identified in the source material: *environment/climate*, *food security/sovereignty*, *community-level impacts*, *political impacts*, and *geopolitical impacts*.
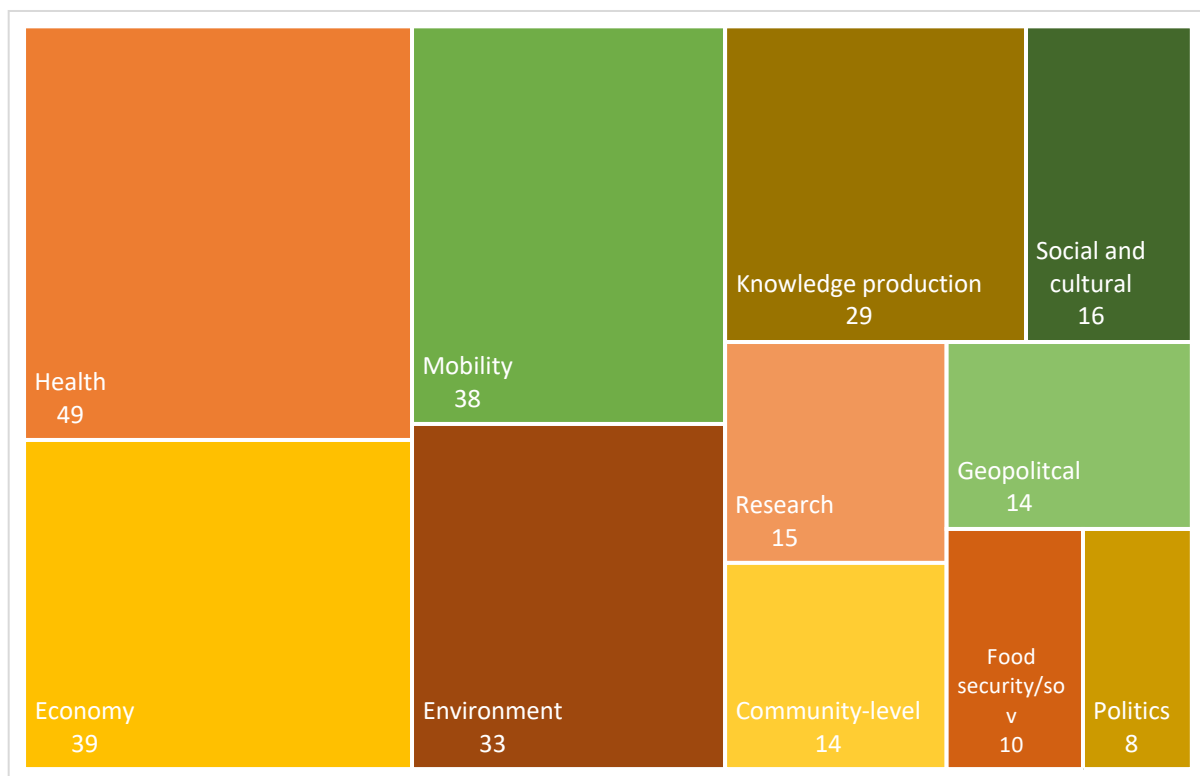

Figure 6: Topics under *Pandemic Consequences*

In Figure 6, we observe not surprisingly that the topic of *impacts on health* (43%) was strongly represented in this category. What is perhaps most interesting about articles included under this topic is the rich diversity of issues that have been connected to health. Several publications considered different Arctic factors that might facilitate or impede the spread of COVID-19 (e.g. weather and climatic conditions, health delivery systems, the size and remoteness of communities, digital service delivery, etc.). Similarly, the types of issues connected to health impacts was notably diverse, including mental health, Indigenous Knowledge, economies, food, and education.

The impact of the pandemic on Arctic economies also consumed a substantial amount of attention (34%). The most prominent sub-topic was the pandemic's impact on various Arctic industries with tourism, energy, extractive industries, and fisheries receiving the most attention. A smaller collection of articles examined the impact on labour markets, and others provided analyses of the broader economic impacts of the pandemic. These sub-topics provide some important insights about aspects of Arctic economies that are being studied; however, it also invites a consideration of the gaps in what has been studied and where more research might be valuable.

The newly added topic whose prevalence in the literature is perhaps the most surprising is the impact of the pandemic on the *Arctic environment and climate* (29%) – from increases in ozone and sea ice to decreases in black carbon and aerosol emissions. Researchers seem keen to study the environmental impacts of a massive disruption in human activity, and the Arctic region seems to be a focal point for this research. Moving forward, it will be interesting to see to what extent the scientific findings from this period might be integrated into and considered in longer term climate and environmental research. In a somewhat different vein, research also emerged about how COVID-19 public health measures (e.g. masks, gloves, and other personal protective equipment) contributed to increased marine plastic pollution in the region.

Lessons for the Future

The final category that we added to classify and analyze the source material was those publications that provided some future-oriented advice or commentary. 40% of all articles include some form of lessons for the future. This category captures a diverse range of contributions in terms of the focus and purpose of the lessons that were shared. 80% of the publications touched upon risk management and mitigation, community and culturally grounded responses, or enabling public infrastructure. Earlier publications provided lessons learned for the immediate management of the pandemic (public health responses, community-specific approaches, travel bans, etc.) or proposed critical research that should be undertaken to understand the pandemic (collection of health and environmental data, experiences of communities, effectiveness of risk management measures).

As the pandemic progressed, lessons regarding the vulnerabilities that the pandemic exposed emerged, and increasing consideration was given to how to improve the resilience of Arctic communities for future pandemics or other major shocks. More than 40% of the articles covering consequences on health, research and education, environment, and tourism offered lessons for future pandemics. However, there was limited insights on the impacts on social and cultural environments, labor markets, tourism, and geopolitics. This suggests that there is a need for additional literature in these areas to strengthen Arctic resilience.

Some articles identified the experience with the pandemic as an opportunity to expose existing gaps and promote appropriate action (connectivity, health infrastructure, transportation, and food systems). A few articles argued that the COVID-19 pandemic demonstrated an urgent need to respond to permafrost thaw and improve Arctic resilience. Others identified the pandemic as an opportunity to challenge the status quo and introduce innovation (scientific research, education, green transition, community capacity development). Many of these articles focused on digital transformation of research and education and large Arctic projects.

For the purposes of this analysis, we did not catalogue or critically examine the lessons that were presented; however, our preliminary analysis suggests that the literature focused on COVID-19 in the Arctic may offer a valuable resource to inform future research and action. It provides information and knowledge that the research and policy communities could draw on to systematically assess pandemic responses and the pandemic consequences, learn from these experiences, and consider how this knowledge will guide and inform future work.

Conclusion

Over the space of three years, we have observed the emergence of a new literature that contributes to our knowledge and understanding of COVID-19 in the Arctic. Our analysis of this literature confirms that a global pandemic cannot be fully understood in the absence of context. This literature shows us how the unique experiences of the Arctic inform our understanding of the spread of COVID-19 and associated public health responses. We observe that risk management and mitigation measures, like isolation, travel bans and vaccination programs, are experienced very differently in Tuktoyaktuk, Canada than Toronto, Canada. The ability to monitor and assess the spread of COVID-19 and access quality care for infected persons is different in Kautikeino, Norway than Oslo, Norway. However, this literature does more than document the unique experiences of Arctic communities with globally and nationally organized public health responses or highlight the constraints or limitations of these responses when applied in Arctic contexts. This literature provides important knowledge about responses and experiences across the Arctic that could be valuable for communities in the Arctic as we prepare and respond to COVID-19, future pandemics, and other global shocks. This literature also brings to light the urgency of identifying the potential risks of future pandemics associated with rising temperatures, thawing permafrost, and other climate change related factors that may challenge the resilience of Arctic communities.

This literature is equally rich for highlighting what COVID-19 reveals (or in some cases confirms) about the Arctic. COVID-19 exposed the existing vulnerabilities of many Arctic communities, including health infrastructure, internet connectivity, housing, and social services. This emerging literature also provides powerful evidence of efforts in the Arctic to focus on and prioritize Indigenous Knowledge and experiences, and it captures the unique strengths and resilience of Arctic communities to develop pandemic responses that are appropriate to their contexts and their needs.

On 5 May 2023, the WHO Director-General declared that COVID-19 is now an "ongoing health issue which no longer constitutes a public health emergency of international concern" (World Health Organization, 2023) and its presence has received dwindling time and attention in the mainstream media for months. Perhaps more concerning, we observe a similar decline in publications in our dataset related to COVID-19 in the Arctic. While COVID-19 continues to spread and some public health measures are still in force, it has largely taken a backseat to other crises and concerns. However, the opportunities to understand and learn from the unique characteristics and experiences of the Arctic with this pandemic have not been exhausted. We hope that this meta-analysis not only deepens understanding about this body of work and fosters connections between researchers doing work in the space, but also exposes gaps in the existing literature, and inspires further research.

Acknowledgements

References

Arctic Council. (2020). *COVID-19 in the Arctic: briefing document for senior arctic officials.* https://oaarchive.arctic-council.org/handle/11374/2473

George Washington University. (n.d.). *Understanding the Gendered Impacts of COVID-19 in the Arctic.* Impacts of COVID-19 in the Arctic

Grydehøj, A., Kelman, I., & Su, P. (2020). Island Geographies of Separation and Cohesion: The Coronavirus (COVID-19) Pandemic and the Geopolitics of Kalaallit Nunaat (Greenland). *Tijdschrift Voor Economische En Sociale Geografie, 111*(3), 288–301. https://doi.org/10.1111/tesg.12423

Levitt, H. M. (2018). How to conduct a qualitative meta-analysis: Tailoring methods to enhance methodological integrity. *Psychotherapy Research, 28*(3), 367–378. https://doi.org/10.1080/10503307.2018.1447708

Nunavut Tunngavik. (2020). *Nunavut's Infrastructure Gap.* https://www.tunngavik.com/files/2020/10/2020.10.20-Nunavuts_Infrastructure_Gap_Report_vf.pdf

OECD. (2011). *Future Global Shocks: Improving Risk Governance, OECD Reviews of Risk Management Policies.* https://doi.org/https://doi.org/10.1787/9789264114586-en

Penney, J., & Johnson-Castle, P. (2020). *COVID-19 and Inuit Nunangat: Research, responsibility and infrastructure inequality.* https://yellowheadinstitute.org/wp-content/uploads/2020/03/covid-19-inuit-nunangat-brief.pdf

University of Northern Iowa. (n.d.). *Arctic COVID-19.* Retrieved February 6, 2023, from https://arcticcovid.uni.edu/homepage

Vogel, G. (2020, March 16). Coronavirus concerns force Arctic mission to cancel research flights. *Science.* https://www.science.org/content/article/coronavirus-concerns-force-arctic-research-mission-cancel-flights

World Health Organization. (2020a). *Pandemic fatigue: Reinvigorating the public to prevent COVID-19.* https://apps.who.int/iris/handle/10665/335820

World Health Organization. (2020b, March 11). *WHO Director-General's opening remarks at the media briefing on COVID-19.* https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020

World Health Organization. (2023, May 5). *Statement on the fifteenth meeting of the IHR (2005) Emergency Committee on the COVID-19 pandemic.* https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic