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Community-partnered Research on Harvesting Practices and Wildlife Zoonoses in Arctic Canada

by Alexandra Kanters

INTRODUCTION

Warming nearly four times faster than the rest of the world, the Arctic is currently experiencing rapid socioecological change (Bush and Lemmen, 2019; Rantanen et al., 2022). Climate change poses potential health threats to both wildlife and people in the Arctic (Harper et al., 2021; Keatts et al., 2021) and is estimated to be a main driver behind the emergence of many infectious diseases in the region (Waits et al., 2018; Kafle et al., 2020; Finlayson-Trick et al., 2021; Aleuy et al., 2022; Reynolds et al., 2022; Grigorieva, 2024). The relationship between land, animals, and people has been known and embodied by Indigenous communities for millennia, as has recognition that the health of one impacts the health of others (Hillier et al., 2021; Riley et al., 2021; Reynolds et al., 2022; Mubareka et al., 2023; Sudlovenick et al., 2024). This is particularly true among Inuit in the northernmost regions of Canada, where the health of people is inextricably linked to both the land and cohabitating wildlife (Karetak et al., 2017; Harper et al., 2021; Reynolds et al., 2022). Many northern Inuit communities are traditionally subsistence-based societies where the harvesting, use, sharing, and consumption of wildlife is closely linked to health and wellbeing (Tomaselli et al., 2018; Keatts et al., 2021). Given the cultural, nutritional, social, economic, and spiritual importance of wildlife for Inuit (Tomaselli et al., 2018; Martinez-Levasseur et al., 2020; Snook et al., 2020; Di Francesco et al., 2021), emerging infectious diseases in wildlife significantly impact Inuit communities who rely on it for livelihood and food. Comprehensive, holistic strategies for addressing this challenge are urgently needed.

Increasingly, Western science has begun to recognize the value of holistic approaches through increasing adoption of the "One Health" paradigm – an approach that recognizes the interconnectedness and interdependence of human, animal, and environmental health. One Health now appears prominently in Arctic research (Dudley et al., 2015; Ruscio et al., 2015; Sonne et al., 2017; Jenkins and Leighton, 2019; Tryland, 2022) and is increasingly used as a framework for health programs, strategies, and policies in Arctic settings (Polar Knowledge Canada, 2024; University of Alaska Fairbanks, n.d.).

In 2024, I was honoured to be selected as the recipient of the Arctic Institute of North America's Lorraine Allison Memorial Scholarship and The H.M. Ali Family Education Award. I am a third-year doctoral student in Community Health Sciences at the University of Calgary's Cumming School of Medicine, working closely with colleagues and mentors in veterinary medicine. My research is part of an international, interdisciplinary project that looks at the emergence and spread of two pathogens in caribou and muskoxen in Arctic Canada. These pathogens are zoonotic, meaning that they can be transmitted from animals to people, mainly through butchering, handling, and consumption of infected harvested animals in this context (Tomaselli et al., 2018; Keatts et al., 2021). The project is part of the Canada-Inuit Nunangat-United Kingdom (CINUK) Arctic Research Programme, where members of each partnered community are co-investigators in the research.

My work specifically looks at how knowledge about these zoonotic pathogens is generated, circulated, and ultimately used for health protection by people who rely on the harvesting of wildlife for food and subsistence. It advances One Health questions to examine how multiple sectors (e.g., academia, government, co-management partners, and private industry) come together to tackle complex problems. Key to the work is recognition that Inuit communities have been protecting themselves against wildlife diseases since time immemorial. This approach emphasizes that a wealth of Inuit *Qaujimajatuqangit* (knowledge) already exists—independently of Western science—about how to live safely in harmony with both the land and its other inhabitants.

It is my great privilege to learn directly from Inuit harvesters in three communities in the Kitikmeot and Inuvialuit Settlement Regions of Inuit Nunangat—the

Inuit homeland in Canada—about community-held, intergenerational knowledge of safe harvesting practices. This work has led to critical reflection on my part about how to engage in ethical knowledge co-production. Some of these reflections follow here.

EMERGING ZOONOSES IN ARCTIC CANADA

Zoonoses have a profound impact on human health. Roughly 60% of all human diseases and 75% of emerging infectious diseases originate from animals (Keatts et al., 2021; Filho et al., 2022; Reynolds et al., 2022). To date, over 200 different zoonotic diseases are recognized worldwide, and the 13 most widespread zoonoses are estimated to account for 2.4 billion cases and 2.7 million deaths per annum in humans globally (Filho et al., 2022). Zoonoses are typically classified in three ways, according to: (1) their etiological agents (i.e., what causes the disease, e.g., bacterial, viral, parasitic); (2) their reservoir hosts (i.e., what can be infected by and transmit the disease); and (3) their epidemiological classification (i.e., how the disease circulates and is transmitted; Filho et al., 2022). Human infection with zoonoses occurs through contact with infected animals. Contact can occur in many ways, including: (1) direct contact with infected animal bodily fluids (e.g., saliva, blood, urine); (2) indirect contact with fomites contaminated by infectious animal secretions; (3) vector-borne, usually through biting arthropods; (4) foodborne, through consumption of contaminated raw or undercooked foods; and (5) waterborne, via contaminated drinking water (Gortazar et al., 2014; Keatts et al., 2021; Filho et al., 2022). Some human diseases also have zoonotic origin but are now mainly or exclusively spread via human-to-human transmission (e.g., HIV, pneumonia, measles, etc.; Keatts et al., 2021; Filho et al., 2022). Of the 200 zoonotic diseases recognized, over 70% originate in wildlife, and the frequency of zoonotic disease spillover into humans is increasing (Gortazar et al., 2014; Keatts et al., 2021; Aguilar et al., 2022).

Climate change is known to influence the spread of zoonoses in ecosystems (Filho et al., 2022; Reynolds et al., 2022). As a region experiencing some of the fastest warming on the planet (Bush and Lemmen, 2019; Sawatzky et al., 2020; Harper et al., 2021), consideration of the impact of emerging zoonoses in Arctic Canada is warranted.

HARVESTING AND HEALTH

Wildlife plays an important role in food security and food sovereignty for northern communities (Keatts et al., 2021; Lysenko and Schott, 2019). Country food (i.e., locally harvested on the land, sea, or ice through hunting, fishing, and gathering of local wildlife and plants) is a cornerstone of northern food systems and the preferred food choice of many Inuit (Tomaselli et al., 2018; Reynolds et al., 2022). Country food is nutrient-rich, and regular consumers of country food have higher intakes of key nutrients (e.g., zinc, vitamin D) needed for good health than those consuming primarily store-bought foods (Harper et al., 2021; Caughey et al., 2022). Country food also plays a critical role in Inuit culture and contributes to food security by ensuring strong, sustainable, sovereign, and self-reliant communities (Henri, 2012; Lysenko and Schott, 2019; Martinez-Levasseur et al., 2020; Reynolds et al., 2022;).

In a literature review of zoonoses in Arctic and boreal biomes, Keatts et al. (2021) identified 25 zoonotic diseases that can be transmitted to humans through hunting, trapping, butchering, sharing, and use of wildlife in these regions. Many reservoir hosts for these diseases include important subsistence species for Inuit. For instance, walruses (*Odobenus rosmarus*)—a species relied on by Inuit in Nunavik (northern Québec) for thousands of years (Larrat et al., 2011; Martinez-Levasseur et al., 2020)—are identified as a host species for toxoplasmosis, trichinellosis, pasteurellosis, botulism, and caliciviruses (Keatts et al., 2021). Similarly, muskoxen (*Ovibos moschatus*) are identified as a host species for brucellosis, cystic echinococcosis, erysipelas, giardiasis, and yersiniosis (Keatts et al., 2021). The importance of these animals for subsistence, livelihood, and culture is well documented among Inuit communities in the Kitikmeot Region of Nunavut (Tomaselli et al., 2018; Di Francesco et al., 2022).

Reynolds et al. (2022:25) state that many zoonoses have "long been known and recognized" by many northern Indigenous communities, and knowledge of how to prepare country food in a way that prevents disease transmission has been passed down through generations (Martinez-Levasseur et al., 2020; Harper et al., 2021). In many cases, colonial influences disrupted intergenerational knowledge exchange, resulting in younger harvesters not knowing how to accurately identify and mitigate food safety risks in wildlife without unnecessary meat wastage (Tomaselli et al., 2018; Reynolds et al., 2022). Public health messaging surrounding zoonoses also plays a role, with "overly zealous news reports" (Reynolds et al., 2022:26), sometimes inciting alarm among community members, leading to decreased confidence in the safety of country food (Myers and Furgal, 2006; Tomaselli et al., 2018).

Keatts et al. (2021) point out that the impacts of zoonoses also extend beyond their potential for infecting humans. Many of the diseases identified in their literature review can impact the health of the animals themselves. Brucellosis, for example, can affect the productivity of *Rangifer* populations through infertility, fetal loss, abortion, stillbirths, and neonate-reduced survival (Aguilar et al., 2022). It can also cause severe gross pathological lesions, which may contribute to decreased survival, poorer performance during migration and predator escape, and lower resilience under environmental and other stressors (Aguilar et al., 2022). Given the significance of wildlife to Inuit wellbeing, the impact of zoonotic diseases on the animals themselves can also pose health concerns for Inuit

beyond direct risk of animal-to-human transmission, for instance, by reducing the number of available animals to harvest (Keatts et al., 2021).

KNOWLEDGE CO-PRODUCTION IN COMMUNITY-PARTNERED RESEARCH

As a community-partnered project, knowledge co-production is essential. Kutz and Tomaselli (2019)—members of the project team—support the use of "two-eyed seeing," a concept put forward by Mi'kmaq Elder Albert Marshall. It means "learning to see from one eye with the strengths of Indigenous knowledges […] and from the other eye with the strengths of Western knowledges […] and learning to use both these eyes together, for the benefit of all" (Kutz and Tomaselli, 2009:1136). The approach recognizes the value offered by different ways of knowing and holds that bridging these can lead to fuller understanding of mutually important topics.

In the context of wildlife and harvesting, co-production of knowledge serves many purposes. First, it helps to ensure better understanding of local context, which helps strengthen both the knowledge itself and any public health actions it informs (McDonald et al., 2016; Tomaselli et al., 2018; Sawatzky et al., 2020; Di Francesco et al., 2021). In their study in Ekaluktutiak (Cambridge Bay), Nunavut, Tomaselli et al. (2018) show that nuanced understanding of local muskox butchering and preparation practices can help in the evaluation of the risks of human exposure to zoonoses in the community. This understanding can in turn inform public health strategies and food safety recommendations at policy decision-making levels that are "tailored to the local context and thus more likely to be effective" (Tomaselli et al., 2018:11). Similarly, in their study of walrus harvesting in Nunavik, Martinez-Levasseur et al. (2020) co-created a list of local recommendations with Inuit harvesters for safe preparation of *igunaq* (a traditional Inuit delicacy that involves fermenting various parts of the walrus) while mitigating risks of botulism and *Trichinella*. Working with local harvesters helped to ensure both the accuracy and relevancy of knowledge for the context in which it was used.

As part of this project, we have been exploring the use of participant viewpoint ethnography (Wilhoit and Kisselburgh, 2016) as a method for co-producing knowledge about safe harvesting practices. Participant viewpoint ethnography is a phenomenological video research method that combines reflexive qualitative interviewing with point-of-view video capture. In my current work, harvesters wear a small unobtrusive wearable video camera (GoPro™) to capture point-of-view, real-time video footage of hunting and butchering activities on the land. Then, when the harvester returns from their hunting trip, both harvester and researcher watch the video footage together. This allows the harvester to describe and elucidate the events captured on video while the researcher asks probing questions. Both point-of-view video and interview data are then analyzed through a collaborative, meaning-making process where data are shared, verified, and discussed with community members.

This work is still in early stages and will be continued in the coming months and expanding to new sites. I look forward to providing updates as my doctoral research continues.

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BIOGRAPHY

Alexandra Kanters is a PhD student in the Department of Community Health Sciences in the Cumming School of Medicine, University of Calgary, and the 2024 recipient of the Lorraine Allison Memorial Scholarship and the H.M. Ali Family Education Award sponsored by the Arctic Institute of North America.

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