



Climate change influences on environment as a determinant of Indigenous health: Relationships to place, sea ice, and health in an Inuit community



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ABSTRACT

This paper contributes to the literature on Indigenous health, human dimensions of climate change, and place-based dimensions of health by examining the role of environment for Inuit health in the context of a changing climate. We investigated the relationship between one key element of the environment – sea ice – and diverse aspects of health in an Inuit community in northern Canada, drawing on population health and health geography approaches. We used a case study design and participatory and collaborative approach with the community of Nain in northern Labrador, Canada. Focus groups ($n = 2$), interviews ($n = 22$), and participant observation were conducted in 2010–11. We found that an appreciation of place was critical for understanding the full range of health influences of sea ice use for Inuit. Negative physical health impacts were reported on less frequently than positive health benefits of sea ice use, which were predominantly related to mental/emotional, spiritual, social, and cultural health. We found that sea ice means freedom for sea ice users, which we suggest influences individual and collective health through relationships between sea ice use, culture, knowledge, and autonomy. While sea ice users reported increases in negative physical health impacts such as injuries and stress related to changing environmental conditions, we suggest that less tangible climate change impacts related to losses of health benefits and disruptions to place meanings and place attachment may be even more significant. Our findings indicate that climate change is resulting in and compounding existing environmental dispossession for Inuit. They also demonstrate the necessity of considering place meanings, culture, and socio-historical context to assess the complexity of climate change impacts on Indigenous environmental health.

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1. Introduction

There are approximately 350 million Indigenous people worldwide, with rich cultures, languages, and histories that have developed through Indigenous nations living in relationship with their lands for thousands of years (WHO, 2007). While there is no one understanding of Indigeneity, some Indigenous people view

their fundamental commonality as a worldview that places special significance on the unity of humans and the natural world (Royal, 2002). There are major gaps in health data for Indigenous populations in some areas of the world; however, where health data does exist it demonstrates that the health status of Indigenous people is significantly lower than for their non-Indigenous counterparts, and spanning an array of indicators (e.g., from infant and maternal mortality and morbidity, to infectious disease burdens, to chronic diseases such as diabetes and cardiovascular disease, to mental health outcomes) (Gracey and King, 2009). We can look to the social determinants of health (e.g., income, education, living conditions, employment, health services access) to understand some of this disparity. However, the underlying cause is rooted in

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Indigenous-specific determinants related to colonization, which has and continues to result in losses of culture, autonomy, land, and health (Gracey and King, 2009; King et al., 2009). Given the importance of the environment as a determinant of Indigenous health based on culturally-specific Indigenous epistemologies and ongoing connections to and dependence on traditional lands, it is no surprise that the disruption, degradation, and erasure of relationships with the land has negatively affected the health and well-being of Indigenous peoples (e.g., Richmond and Ross, 2009; Tobias and Richmond, 2014).

As has also been identified in the literature, the environment is not solely a source of health benefit for Indigenous populations, but also health risk. For example, traditional foods are a source of nutritional, economic, and cultural benefits for Inuit in northern Canada at the same time as risks from exposure to environmental contaminants such as lead, PCBs, and mercury in some species and tissues (Donaldson et al., 2010). Also, land-based activities such as hunting can result in increased exposure to environmental hazards (e.g., UV exposure, extreme weather events) and unintentional injuries, but are also a source of multifaceted benefits (Cunsolo Willox et al., 2012; King and Furgal, 2014).

The relationship between the environment and Indigenous health is also changing, related to social and material changes and changes in the environment itself. In Canada as in other parts of the world, government policies of displacement and assimilation, enacted through Canada's *Indian Act* and the residential school system, for example, affected and continue to impact Indigenous peoples' relationship with the land (RCAP, 1996). These impacts are interacting with rapid social changes taking place in Indigenous communities today related to changing technology use, wage economy participation, changing social and cultural norms, and other changes brought on by the influence and imposition of Western culture, social norms, technologies, economic structures, and governance institutions (RCAP, 1996). For example, the erosion of land-based skills among younger generation Inuit has been linked to impacts of assimilationist policies such as residential schooling, which interrupted intergenerational knowledge transfer, as well as broader cultural and economic changes taking place in Inuit communities today (Pearce et al., 2011).

The nature of the environment itself is also changing, related to impacts of large-scale development and anthropogenic climate change (IPCC, 2013, 2007). A great deal has been written about climate change and direct and indirect impacts on health (IPCC, 2014, 2007). Climate change is predicted to pose a greater health risk for Indigenous populations related to their greater dependence on local resources, habitation in regions of the world where the environment is changing rapidly, and socio-economic disadvantage (Ford, 2012; IPCC, 2014). As Ford (2012) notes, despite the greater exposure and sensitivity of Indigenous populations to climatic health risks, the empirical evidence of climate influences on Indigenous health, while growing, remains limited. The majority of research on health influences of climate change for Indigenous populations has taken place in the Arctic and Australia, related to the strength of the climate change signal in these regions (for syntheses, see ACIA, 2005; Furgal, 2008; Green et al., 2009; IPCC, 2014). However, there are still many things we do not know or know little of, for example related to the influence of changing environmental conditions on the mental, social, and cultural well-being of Inuit (Cunsolo Willox et al., 2013, 2012; Furgal, 2008). Given the greater vulnerability of Indigenous populations to climate change (Ford, 2012), there is a critical need to increase our understanding of the changing nature of the environment as a determinant of Indigenous health in the context of a changing climate.

This paper examines climate change influences on environment

as a determinant of health among Inuit. Currently, as a definition of Inuit health based on an Inuit worldview is absent from the literature, we draw on available definitions of health and Indigenous health but note our caution in relying on generalities. For the purposes of this paper, we define health as physical, emotional, mental, social, and spiritual well-being, and not just the absence of disease and infirmity (Committee on Indigenous Health, 2002; Reading and Wien, 2009; WHO, 1948). Health is both individual and collective in this context.

In this study, we examined how Inuit sea ice users in the community of Nain in the Labrador Inuit Settlement Area of Nunatsiavut in subarctic Canada view the influence of using sea ice on health and well-being. Collaboration on this project was based on concern expressed by residents of Nain about increasing unintentional injuries and anxiety associated with changing ice and weather conditions (e.g., Furgal et al., 2002), and a history of relationships and collaboration in the region with one of our co-authors (CF). The project involved university-community research collaborations with the Nunatsiavut Government (NG), the Inuit self-government body in Nunatsiavut, and Nain Ground Search and Rescue (NGSAR), a volunteer-based search and rescue team primarily made up of hunters in Nain. We conducted a case study with a sequential mixed methods design. In this paper, we report results from the qualitative stages of our case study, involving two focus groups with expert sea ice travellers and 22 individual interviews with sea ice users.

1.1. Context of Inuit sea ice use in Arctic Canada

While Inuit have a close relationship with their environment, sea ice is an especially critical element of the Arctic environment for Inuit (ICC, 2008). For much of the year it forms an extension of the land that allows Inuit to move freely across their homeland through a network of routes, leading Inuit in this study and elsewhere to refer to sea ice as their highway (Aporta, 2004; Aporta et al., 2011; ICC, 2008). Sea ice routes are used by Inuit to facilitate access to important wild food resources and culturally-significant places (Aporta, 2004; Aporta et al., 2011). In addition to positive health influences, the variable and challenging Arctic environment means travel on sea ice can also bring about negative physical health impacts such as frostbite from cold exposure and hypothermia or drowning from falling through the ice (Durkalec et al., 2014; Furgal, 2008; Giles et al., 2013). The relationship between environmental exposure and injury and trauma in Inuit communities is still poorly understood due to limited injury epidemiology data (GNWT, 2004; Légaré, 2007). This knowledge gap is of significant public health concern, as unintentional injuries are over four times higher in Inuit regions compared to Canada as a whole (ITK, 2010), with environmental exposures potentially contributing to this disparity. For example, rates of drowning for Indigenous Canadians are six times higher than for non-Indigenous Canadians, and eight times higher for snowmobile-related drownings (Canadian Red Cross, 2006; Health Canada, 2001). Hospitalization rates for unintentional injuries from land transportation in high Inuit population areas are greater than in high First Nations areas, high Metis areas, and low Aboriginal population areas in Canada for adults, youth, and children (Finès et al., 2013; Oliver and Kohen, 2012).

While Inuit have been managing environmental risks in a challenging environment for millennia, the changing nature and increasing variability of environmental hazards is predicted to increase the frequency and severity of physical health impacts from environmental exposure (ACIA, 2005; Furgal, 2008; IPCC, 2014). Indeed, communities in the Canadian Arctic have been reporting concerns about increasing injuries and anxiety related to changing ice and weather conditions (Ford et al., 2009, 2008; Furgal et al.,

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