Climate Change and Human Health in the Arctic:
Recommendations for the Arctic Council

Background:

Anthropogenic climate change has been at the forefront of the discussions in the Arctic Council since its creation. Noting that "the evidence of global warming is in no place more obvious than in the Arctic region" the Council has established itself as a unique body with both a genuine interest in the impacts of climate change in the Arctic and a purposeful pursuit of actions and policies that maintain the integrity and longevity of the circumpolar region. (Arctic Council) With this in mind, this report will focus on the human side of climate change- specifically how human health has faced challenges and will continue to battle those challenges in the face of increased warming and pollution in the Arctic region.

The impact of climate change on human health is a multi-parameter problem unbounded by borders and unparalleled in impact. This problem is particularly destructive in the Arctic as black carbon, warming temperatures, and melting permafrost have threatened food security, jeopardized homes, and lead to water and sanitation crisis. For the four million people which live in the Arctic, climate change poses a very real and ever increasing threat to their health and their way of life.

Climate Change in the Arctic:

The presence of climate change has manifested itself in a number of ways including melting sea ice, changes in albedo, and loss of habitat for both humans and animals. The sources of melting sea ice come as a result of warming temperatures due to burning of fossil fuels that have changed the Earth's natural greenhouse. "Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO2) ... A stronger greenhouse effect will warm the oceans and partially melt glaciers and other ice, increasing sea level." (NASA) As temperatures increase, the melting sea ice will pose a threat to both animal habitats and human settlement in the Arctic by erosion of critical land areas and division and loss of access between areas formerly connected by ice. This threat also expands beyond the borders of the Arctic, as "less sea ice leads to altered temperature and salinity in seawater, which in turn affect global ocean circulation patterns; these patterns play a major role in determining the climate in regions all over the world." (Norwegian Polar Institute)

In addition to warming temperatures and melting sea ice, increased carbon emissions lead to the buildup of black carbon that climate models predict will reduce surface albedo "further contributing to global warming and near-worldwide melting of ice." (Hadley, 2012) The Earth's albedo is vital for reflection of the solar constant away from the Earth's surface. A loss of albedo, as such leads to a decrease in ability to reflect radiation and further feeds into the warming cycle exacerbated by fossil fuels and greenhouse gases. In addition to its melting properties, "toxicological studies suggest that black carbon may operate as a universal carrier of a wide variety of chemicals of varying toxicity to the human body." (Janssen, 2012) This toxicity impacts the cardiovascular health of individuals exposed to black carbon and its affiliated toxic chemicals. As such, the particulates are equally lethal to the environment as well as to human and animal health.

Human Health in the Arctic:

While some factors above alluded to the ways that climate change impacts human health, the lack of insulation from environmental change and the homogeneity of the environment in the Arctic puts human inhabitants in a vulnerable position when climate change changes their environment. Beginning with a focus on particulate emissions and toxins, this section will begin with an analysis on the impact of climate change on Arctic food chains and furthermore discuss the impact of climate change on water and sanitation systems.

"Due to unique geographic and climatic characteristics, the Arctic has become a repository for contaminants transported long distances through the atmosphere and via ocean currents… often persistent, these chemicals then bioaccumulate and biomagnify through Arctic food chains into the species that make up traditional (country) food sources for many Arctic peoples**."** (AMAP, 2015) Our global usage of fossil fuels has disproportionately impacted the Arctic's population and ecosystem. As these contaminants, chemicals, and particles of black carbon have agglomerated in the Arctic, they have both changed the Earth's albedo, and adversely impacted the health of the Arctic's animals and people alike. The biomagnification of chemicals in the food chain is a significant problem for indigenous communities who often tie their livelihood to the animals that they raise and the fish and mammals they hunt for. These populations often live in "food-deserts" in which they lack the means to access store-bought foods as alternatives to traditional foods, and when access is possible, these alternative store-bought foods are not as nutrient rich as a traditional diet. (Donaldson, 2010) Is this way, climate change is not only hurting the environment in the Arctic but impacting the direct health of humans and specifically stripping those who lack the means to insulate themselves from the impact of climate change of viable alternatives for food and survival. It is a common theme that indigenous people who often live in remote areas of the Arctic region have less flexibility and less means to establish resilience and protection against the impacts of climate change. Thus, future health considerations will need to take into account the relative resources of various arctic populations.

Another direct effect of climate change includes an increase in ambient temperature in the Arctic. "This warming, in particular, has reduced the amount or extent of sea ice, which is very important for protecting coastal villages from erosion… particularly concerning from a health perspective is the damage to water intake systems resulting in contamination of water supplies, and the thawing can also damage access roads, water storage tanks, wastewater treatment facilities, and they can render water and waste-water treatment systems inoperable." (Parkinson) Without monitoring, mitigating, and adapting our systems according to anticipated changes in melting patterns, this lack of safe water and sanitation systems may have a disastrous effect on populations living in the Arctic and spark the need for climate-related migration and movement if mitigation does not meet the pace of melting. The looping cycles of impacts of anthropogenic climate change necessitate in-depth analysis of the ways that climate warming and changing environments can impact quality of life, safety, and economic opportunity for individuals in this region. Just as climate change is not bounded by borders, the impacts are equally as pervasive and detrimental in both short run and long run circumstances. As warming threatens water and sanitation, individuals are put into economically vulnerable situations which put them at greater risk for vulnerability down the road.

Indigenous Perspectives:

Integral to understanding the ways that climate change has impacted the people and environment of the Arctic is understanding and seeking out the perspectives of Arctic indigenous peoples. Approximately ten percent of the four million people living in the Arctic region are thought to belong to the Arctic's indigenous groups and populations. (Arctic Center) Through their long history of inhabitancy, traditional way of life, and deep connection with their land, the indigenous peoples of the Arctic provide a vital and unique perspective of the impact of climate change on their health and environment.

This deep knowledge of the Arctic is reflected in use of traditional weather forecasting practices including using "wind direction and speed, cloud formations, animal behavior, and the stars, sun, and [the] moon" to predict future weather. (Henshaw, 2006) This ability to predict the weather, however, has been thwarted by changing weather patterns exacerbated by climate change. In an interview conducted by Sherry Fox, an Inuit hunter/fisherman stated "my predictions [about the weather] used to work and I used to give advice to younger people about going out, whether to go out or stay home. But I can't do that today because it is so unpredictable" (Qaqqasiq, 2001) These comments highlight the broader implications for indigenous peoples- more frequent extreme weather and more unpredictable weather events are hindering the ability for hunters and fisherman to estimate the safety of their expeditions. In this way, climate change not only is impacting the quality of their food supply, the safety of their homes and water systems, but also fundamentally hindering their ability to work and move freely. The implications and importance of this aspect of climate change cannot be ignored or understated. When individuals are unable to make accurate assessments of their safety, the economic efficiency, safety, and mental health of these populations will inevitably suffer.

Past Policies and New Recommendations:

The most recent health assessment published by the Arctic Council was the 2015 AMAP Assessment on Human Health in the Arctic. This report was the fourth publication in the AMAP sequences beginning in 1998 and updated in 2002 and 2009. The Arctic Monitoring and Assessment Programme focused this analysis on levels of contaminants and risk communication methods across the Arctic region. The findings and scope of this report were supplemented by the One Health initiative that was spearheaded by the Sustainable Development Working Group and co-sponsored by the United States and Canada.

These reports have established a strong foundation for understanding the impact of climate change on human health in the arctic. Although they are supported by other complementary working groups including the Arctic Human Health Expert Group, there is considerable work to be done to bridge the gaps between specialty surveillance and holistic analyses of health in the Arctic. The first step may thus be the establishment of a standing body dedicated to health and wellness analysis and advocacy in the circumpolar region. While in the past specific bodies have been created to analyze aspects of human health, including the Circumpolar Health Observatory proposed by the Arctic Human Health Expert Group, the narrow focus of their work prevents lasting prioritization of human health on the Council's agenda. In order for human health and quality of life in the arctic region to improve, it is vital to ensure that this topic is more than a passing interest or agenda item for the head of the council in any given cycle.

Conclusion and Policy Recommendations:

Human health is as critical foundation necessary for maintaining peace, facilitating human understanding, ensuring economic stability, and promoting human rights, and human dignity. Remaining and ensuring that we are steadfast in our commitment to monitoring and maintaining human health will not only play a direct role in the quality and length of life for people in the Arctic, but will also result in a feedback loop of choices that will make our environment cleaner, our politics more stable, and our economy stronger in the long run. This outcome requires not only a sincere interest, but a credible commitment to advocating for and supporting initiatives that empower Arctic communities- especially indigenous communities who are most vulnerable to climate impacts. As such, this report has outlined two key recommendations for the members of the Arctic Council to ensure the efficacy of their work and the longevity for the environment and people of this region.

First, ensure that health is a constant consideration in Arctic policies. Including health considerations and providing resources and funding opportunities to mitigate land erosion, infrastructure degradation, compromised water systems, and poisoned food systems will have multiplicative positive externalities and effects on other Arctic Council agenda items. Because human health is a fundamentally human priority, this mission will provide an everlasting basis for cooperation and mutual understanding.

Secondly, continue to incorporate indigenous knowledge and priorities into the structure of human health related initiatives and Arctic Council bodies. The incorporation of traditional knowledge will not only supplement and deepen scientific understanding of the state of nature in the region, but also provide much needed context about environmental changes as well as a vital perspective for necessary human health intervention points. Because indigenous populations often lack the formal government and funding structures that Arctic Council members often have, their perspective will allow members to understand the key places with the most need and greatest potential for return on investment.

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