

Climate Change and Food Security in Regional Inuit Centers

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Abstract

Food insecurity is a chronic problem affecting many Inuit communities and is likely to predispose Inuit food systems to the negative effects of climate change. Using in-depth case studies, this project has identified and characterized the vulnerability and resilience of food systems in four regional Inuit centers to climate change (RICs) (Iqaluit, Arviat, Inuvik and Kuujjuak). Given the limited work on food systems in these communities, the work was structured around 2 phases. Phase 1 aimed to: i). document and describe the nature of food insecurity among at-risk populations in RICs, ii). characterize the environmental, biological and socio-economic determinants of food insecurity at various scales; iii). document coping strategies to manage food insecurity, and iv). examine the pathways through which climate change might affect food insecurity for at-risk peoples in RICs. Phase 2 has focused on policy linkages, and has sought to identify opportunities and priorities for adaptation intervention to enhance food security among high risk populations in the context of rapid current and future change, working closely with decision makers at multiple levels. In the final year of the project (2014/15) there has been a strong emphasis on knowledge translation in partner communities and at the regional level, including a multi-day workshop held in Iqaluit in June, along with the completion of student projects focusing on community identified research needs. The final year has also begun to develop new projects and collaboration to continue the work on completion through ArcticNet, including a targeted focus on food security among children in Iqaluit, the gendered dimensions of food insecurity in RICs in a changing climate, and examining what we can learn from Greenland for food programming in Nunavut (funded through the Government of Nunavut).

Key Messages

- Food insecurity in larger regional centres is less pronounced than in the smaller communities, but still remains high compared to southern Canada,

and is a chronic problem among a subsection of community members. Community food programs are important for meeting the needs of the highly food insecure, but provide only a stop-gap measure and indicate the need for broader food system enhancement.

- Determinants of food insecurity in larger regional centres primarily reflect socio-economic factors, with climate change less pronounced as a stressor than smaller communities. This derives from the stronger wage economies and reduced dependence on traditional foods.
- Seasonality does not appear to have a major influence on food insecurity, at least in surveys conducted in Iqaluit. While this requires further analysis, we hypothesize that a strong wage economy provides some buffering to variations in access and availability of traditional foods.
- Determinants of food insecurity ultimately act at the national scale, with colonial legacy important to consider. Interventions to enhance the resilience of the food system in-light of multiple stresses need to focus on multiple scales, not just the local.
- There is limited research and policy discussion on how to adapt to the health effects of climate change, including to potential food security implications. Adaptation needs to be mainstreamed into ongoing policy planning to be effective.
- In addressing these research gaps, project 3.7 is transitioning from conducting baseline research examining the problem of food insecurity and its links to environmental factors, to working with communities to examine intervention opportunities.

Objectives

- Contribute to IRIS 2 Food Security chapter for region 2 (Ford lead author).

- Analyze qualitative data on the vulnerability of high risk groups to the food security implications of climate change collected in 2012
- Analyze food security survey data collected in Iqaluit in 2012/13.
- Identify determinants of food insecurity at multiple scales and characterize links to climate change, across the case study locations.
- Make recommendations for enhanced food programming in the partner communities.
- Plan for intervention phase of the research, working closely across the team and with northern collaborators.

Introduction

Food security exists “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO 2009). Access to adequate food has been identified as a major challenge in the Canadian Arctic, particularly for Inuit communities, where levels of food insecurity are consistently higher compared to Southern Canada (Lawn and Harvey 2003, Myers et al. 2004, Power 2008, Egeland et al. 2010b, Sharma et al. 2010b, Egeland 2011, Rosol et al. 2011, Huet et al. 2012). In particular, studies highlight that women, older residents, and those relying on income support are often less likely to be food secure (Chan et al. 2006, Ford and Berrang-Ford 2009). Meanwhile, having an active hunter in the household or consuming country food have been shown to be protective against food insecurity in some studies (Ford and Berrang-Ford 2009, Huet et al. 2012). Other factors such as unemployment, low income, increasing cost of hunting, reduced number of active hunters, socio-cultural changes such as reduced sharing of food and decreased transfer of traditional hunting knowledge, colonial history, and the impacts of climate change on the ability to hunt and fish, have also been identified as stressing food systems (Myers et al. 2004, Chan et al. 2006, Ford et al. 2006, Furgal and Seguin 2006,

Richmond and Ross 2009, Beaumier and Ford 2010, Wesche and Chan 2010, Pufall et al. 2011, Wakegijig et al. 2013).

The majority of food security studies in Arctic Canada have focused on small, remote communities (e.g. studies conducted as part of the Healthy Foods North program) or have examined prevalence of food insecurity at a regional scale without differentiating by community (e.g. studies conducted as part of the Inuit Health Survey). While this work has significantly contributed to our understanding on food insecurity, limited research has been conducted in larger centers of the North (Lardeau et al. 2011, Ford et al. 2012). These include the territorial capital cities and regional centers including (e.g. Inuvik, Rankin Inlet, and Kuujuaq). These rapidly growing settlements are home to a significant number of residents of northern Canada, and differ in social-economic-demographic structure from smaller communities where research has primarily been conducted. As such, it is unknown if predictors of food insecurity identified in the literature are applicable for larger regional centers, where identified risk and protective factors including sharing networks, employment, education, and participation in traditional harvesting activities may differ. It is also unclear whether the high rates of food insecurity documented in smaller communities are also prevalent in larger settlements.

This ArcticNet project brings together food security researchers, students, community members, and policy makers from across the North to examine the experience and determinants of food insecurity in regional Inuit centres. The project has a specific focus on ‘high risk’ groups and how underlying socio-economic-cultural factors will affect resilience and vulnerability to climate change. The project leverages significant co-funding (e.g. CIHR IK-ADAPT project, IDRC IHACC project) and expands the focus of other ArcticNet food-focused projects with its focus specifically on the larger centres in the North. As such the work is particularly timely with the increased political interest in northern food security. The

Government of Nunavut for instance, is developing a food security strategy, and the work conducted here has directly informed this strategy, with former MA student Sara Statham (who was trained through this ArcticNet project) now the food security coordinator for the GN.

In this annual report we chart the progress made in meeting our objectives. We are now wrapping up phase 1 of the research which has identified the nature and determinants of food insecurity in Inuvik, Iqaluit, Kuujuaq and Nain, and links to climate change and broader socio-economic processes. We are currently working with policy makers and communities to disseminate the findings, and writing up peer reviewed articles (a number of which have already been published). We have also reflected as a team on how key overarching principles of health adaptation to climate change in Arctic Canada. Phase 2 is also beginning, in which we are using research from phase 1 to inform the development of food system interventions.

Activities

1. Iqaluit

Fieldwork

A second food security survey was applied to 523 randomly selected households in May 2013, complimenting the survey administered in fall 2012. A team of 21 local research assistants was assembled and trained to conduct the survey, working closely Ford's research team at McGill. This survey has allowed us to examine seasonal differences in food security by season, and evaluate the extent to which findings differ across surveys.

Publications

Submitted undergraduate honors thesis (to be submitted to the Journal of Nutrition after community discussion)

- Guo, Y. Prevalence and Determinants of Food Security in Iqaluit, Nunavut: A cross-sectional analysis.

Presentations

- Guo, Y. Prevalence and Determinants of Food Security in Iqaluit, Nunavut: A cross-sectional analysis. Presentation to the Nunavut Anti-Poverty Coalition, May 27th, 2014.

Other

- The 21 trained surveyors are catalogued in a database held by the Nunavut Research Institute as individuals trained to be involved in research.
- A results sharing workshop is being organized for June 2014. Day one of the workshop will target the community as a whole, while day two will focus specifically on knowledge users. We also have a meeting scheduled with NTI to discuss the findings.

2. Inuvik

Fieldwork

The Inuvik fieldwork was completed in 2012, and 2013 activities by Susan Chatwood's group focused on disseminating the research findings to public health and government officials in the NWT and ISR, holding in-person meetings to this end throughout 2013. Associated with this ArcticNet project, and linking into other initiatives, a land-based workshop on health and well-being was organized for elders and youth in summer 2013.

Publications

- Ford, J., Lardeau, M., Blackett, H., Chatwood, D., and Kurzewski, D. (2013). Community food program use in Inuvik, Northwest Territories. *BMC Public Health* 13:970.

3. *Kuujuuaq*

Fieldwork

The Kuujuuaq fieldwork was completed mostly in 2012, with some follow-up interviews with decision makers conducted in 2013. Activities in 2013/14 have primarily focused on examining the findings in-person with meeting with stakeholders in public health.

Publications

- Furgal, C. and Rajdev, V. (in prep). Food support mechanisms in Nunavik: A Review of Food Support Mechanisms in Nunavik: Contributions to supporting household food security for all. In preparation. Presentation to Nunavik Nutrition and Health.
- Furgal, C., Hamilton, S., Meakin, S. and Rajdev, V.. Choosing among the options: Policy and program analysis for food security strategies in Inuit regions (in prep) Committee, Kuujuuaq, Nunavik, QC.

Presentations

- Furgal, C. and Rajdev, V. (2013). Food support mechanisms in Nunavik: Contributions to supporting household food security for all. Presentation to the Nunavik Nutrition and Health Committee, November 2013

4. *Overarching*

In 2013/14 a key objective has been to bring together the project team, including students and decision maker collaborators, to reflect on how the findings from the community-based research conducted through this ArcticNet project speak to larger issues of vulnerability and adaptation to climate change in the context of northern food systems. It is also noteworthy that a key objective for 2013/14, as articulated in the previous annual report, was to initiate pilot interventions for addressing food security in the case study communities. This activity has been delayed for now, reflecting various challenges, but will be informed by some pilot work on the use of community freezers in Nain by Chris Furgal's group. We plan to

continue conversations with community groups and government stakeholders on how best research can evaluate various policy options for enhancing food systems, and was the focus of a workshop held in May at McGill by Ford's group, and attended by the NIs. An additional change from previous objectives also included MSc student Brad Hiebert (Queens) altering the focus of his masters research from examining food purchasing behaviors in Iqaluit, to focusing more broadly on discourse surrounding food policy programming in the North.

Publications

- Ford, J. Knight, M., and Pearce, T. (2013). Assessing the 'usability' of climate change research for decision making - A case study of the Canadian International Polar Year. *Global Environmental Change* 23 1317-1326
- Ford, J., Cunsolo-Wilcox, A., Chatwood, S., Furgal, C., Harper, S., Mauro, I., and Pearce, T. (in press). Adapting to the effects of climate change on Inuit health. *American Journal of Public Health*.
- Hibbert, B. (2014). 'Heroes for the Helpless': Using National Media to Maintain Settler Dominance in the Canadian Arctic. MSc Thesis, Queens University.

Meetings

- Team meetings were held in Montreal in April and in Halifax in December to discuss emerging findings and plan for the next year.
- A workshop on community based adaptation and intervention research was held at McGill, May 1st and 2nd, 2014.
- The team had numerous posters and oral presentations at the ASM, and organized a special session on Inuit knowledge and health adaptation, in which NIs Furgal and Chatwood presented, and PI Ford chaired.
- Ford was a poster judge at the ASM.

Results

Iqaluit food security survey (based on Guo 2014, honors thesis; to be submitted to the Jrn. of Nutrition)

A modified United States Department of Agriculture Food Security Survey was applied to 538 randomly selected households in September 2012 and 523 in May 2013. Chi-square tests and multivariable logistic regression were used to examine potential associations between food security and 11 risk factors identified in the literature. 28.7% of surveyed households in Iqaluit were food insecure in September 2012, a rate three times higher than the national average, but lower compared to other smaller Inuit communities in Nunavut. Prevalence of food insecurity was not significantly different in May (27.2%). In both seasons, food insecurity was higher in households identifying as Inuit and with reliance on income support.

However, additional factors, such as unemployment and low education level were also associated with higher levels of food insecurity in one of the two survey periods. In contrast to previous research among Arctic communities, gender and consumption of country food were not positively associated with food security. These results are consistent with research identifying high food insecurity across the Canadian Arctic. Nevertheless, the factors associated with food insecurity in Iqaluit differed from those identified for smaller communities, suggesting that experiences with, and processes of, food insecurity may differ between small communities and larger commercial centres. Lack of seasonal variation in food insecurity levels suggests that country food consumption, traditional knowledge and sharing networks may play a less important role in larger Inuit communities.

Determinants of food program usage in Inuvik (based on Ford et al. 2013, in BMC Public Health)

Community food programs (CFPs) provide an important safety-net for highly food insecure community members in the larger settlements of

the Canadian Arctic. Working with the community of Inuvik, NWT, we identified CFP usership and determining factors (based on photovoice and a food survey), comparing the findings with comparable work conducted in Iqaluit in 2011. Users of CFPs were demonstrated to be more likely to be housing insecure, female, middle aged (35–64), unemployed, Aboriginal, and lacking a high school education. Participants are primarily chronic users, and depend on CFPs for regular food access. The work indicates the presence of chronically food insecure groups who have not benefited from the economic development and job opportunities offered in larger regional centers of the Canadian Arctic, and for whom traditional kinship-based food sharing networks have been unable to fully meet their dietary needs. While CFPs do not address the underlying causes of food insecurity, they provide an important service for communities undergoing rapid change, and need greater focus in food policy herein.

Broad-level barriers to addressing food insecurity in Nunavut (based on Hibbert MSc thesis)

This study examined national coverage of Nunavut food insecurity as presented in two of Canada's most widely read newspapers: The Globe and Mail and National Post. A critical discourse analysis (CDA) was employed to analyze 50 articles from The Globe and Mail (36) and National Post (14). CDA suggests national print media propagates the Inuit's position as The Other by selectively reporting on social issues such as hunger, poverty and income. Terms such as "Northerners" and "Southerners" are frequently used to categorically separate Nunavut and the Inuit from the rest of Canada. Media reports focus on social problems such as food insecurity, while Inuit-driven efforts to resolve their own issues are widely ignored. This effectively portrays the Inuit as helpless and the territory as a failure. Furthermore, it allows Canadians to maintain the colonial view of the Inuit, and erroneously assume initiatives developed primarily by the Federal Government are effectively addressing Northern food insecurity.

Community food programs in Kuujjuaq

Documents were gathered and semi-directive interviews were conducted in Kuujjuaq with managers of existing food support mechanisms in 2012-13. Interviews identified and reviewed existing food programs' strengths and challenges, years of operation, location of operation, goals or mandate, target population, source of funding, needed improvements and the capacity/size of program. Individually and collectively, the programs were reviewed for their treatment of the critical components of food security (availability, accessibility and quality) as identified by Furgal and Rajdev. A review of the landscape of programs to support food security is providing an identification of gaps in the network as well as opportunities / needs for greater support in the future. The Nunavik Inuit Health Survey dataset was acquired and is being analysed for relationships between community food security use, food security status and other factors. The review of food programs and analysis of regional data is feeding directly into the Nunavik Board's (NRBHSS/NNHC) discussions for the development of a regional strategy to support food security.

Key considerations for health adaptation (based on Ford et al. in press, AJPH)

To inform and initiate debate on the broad contours of health adaptation programming in the North, the team got together in-person and online to develop a position paper outlining key considerations for adaptation to the health effects of climate change for Canada's Inuit. The paper draws upon the teams' experience in research and policy debates on climate change and health in the Arctic through ArcticNet funded work, and extensive debate with northern-based decision makers and communities. Key considerations include: Adaptation is about enhancing current management of climate-related health risks; Adaptation is about tackling the root causes of vulnerability; Adaptation is about leveraging and building on socio-cultural strengths; Adaptation is about integrating a culturally-appropriate climate change lens into strategies, policy and programming.

Discussion

Iqaluit food security survey

As the first study to examine prevalence of food insecurity in Iqaluit, NU, and more generally to focus on the seasonality of food insecurity in an Inuit community, this work contributes to a nascent scholarship focusing on food systems in the larger, rapidly growing settlements of the Canadian Arctic.

While the magnitude of food insecurity documented is lower than in previous work focusing on smaller communities and from studies characterizing regional food security trends, prevalence is still significantly higher than in southern Canada, and indicates that access and availability to food of sufficient quality remain a problem even in major commercial centers in Canada's northern communities. Food security is strongly patterned by ethnic origin, with Inuit households nine to thirteen times more likely to be food insecure than non-Inuit households. Indeed, if only Inuit households are included in the analysis, the prevalence of food insecurity of approximately 45% in both September and May is closer to that documented elsewhere in Nunavut. This rate of food insecurity is particularly high given the strong economic growth in Iqaluit associated with resource development, government, and associated services, and is consistent with research on Iqaluit food programs, which has identified a chronically food insecure subset of Iqaluit's population who have been unable to benefit from economic development (Ford et al. 2012). While we do not examine the underlying causes of such trends here, other scholarship has identified acculturative stresses associated with community relocation, environmental dispossession, and often forced cultural assimilation (e.g. through residential schools) as important contexts facing contemporary Inuit settlements, and which frames low rates of educational attainment, higher unemployment, and food security challenges (Damas 2002, Smylie et al. 2006, Smylie and Anderson 2006, Richmond and Ross 2008, Richmond and Ross 2009, Richmond 2009, Tester 2009). Indeed, as Wakejigig et al. (2013)

note, to achieve any kind of success in the North, food policy has to take into account these broader determinants.

Low education level, unemployment and reliance on income support also emerged as significant predictors of food insecurity. These factors are often associated with a lower socio-economic status, which might reduce household ability to afford fresh nutritious food (Bartfeld et al. 2006). These results are consistent with similar findings from the 2007-2008 Canadian Community Health Survey, which indicated a higher prevalence of food insecurity among households relying on income support and those with less than secondary graduation as the highest level of education attained (Statistics Canada 2009). Unemployment is often associated with household food insecurity, although this has been shown in other communities outside of the Canadian Arctic (Kendall et al. 1995, Sarlio-Lähteenkorva and Lahelma 2001, Loopstra and Tarasuk 2013). The fact that employment was not a significant predictor in September is likely due to its high colinearity with education level, which is also a measure of socio-economic status; employment and education are here likely both reflecting generalized socio-economic opportunity. Finally, reliance on income support is also a significant predictor of food insecurity among both Inuit and non-Inuit households in the Canadian Arctic and across Canada (Che and Chen 2001, Huet et al. 2012).

Age of the person in charge of food preparation was a significant predictor in May, with older respondents being more food secure. This contrasts with previous research in North America which reports high levels of food insecurity among older respondents (Ritchie et al. 1997, McIntyre et al. 2002). However, given that Iqaluit's population is relatively young, the older respondents in this study might be categorized differently in other research settings. In this case, the higher age might be an indication of higher education level attained and access to better employment opportunities in Iqaluit. It might also be a reflection of the non-Inuit migrants who come for work in Iqaluit. In contrast to previous research, we did not find gender

or consumption of country food to be associated with improved food security among Inuit respondents. (Ford and Berrang-Ford 2009), for example, found in Igloodik that female respondents and those who did not regularly consume traditional foods were significantly more likely to be food insecure. Country food is often preferred to store-bought food due to its cultural importance and higher nutritional value (Ford et al. 2006, Egeland et al. 2010a). A potential explanation supported by other work in the community is that despite the continued importance of hunting and fishing in Iqaluit, engagement in these activities is lower than in smaller communities due to the strong waged economy (Searles 2002, Searles 2010b, Ford et al. 2012, Ford et al. 2013). Moreover, given a high degree of transience in residence, in-migration from other communities, and size of Iqaluit, it has been argued that food sharing is practiced less compared to smaller settlements, such that traditional foods are not necessarily available when people don't have the funds to access store foods (Lardeau et al. 2011, Ford et al. 2012), an important and widely documented coping mechanism in smaller communities. Previous research has argued that, within Inuit and Aboriginal communities, fresh fruits and vegetables were often considered as being too expensive and of poor quality, which has implications for food security (Chan et al. 2006, Richmond and Ross 2009). Although less nutritious, processed food is often more affordable, more energy-dense and can be stored longer (Richmond and Ross 2009, Sharma 2010).

Lifestyle changes, acculturation, along with increased access to market foods in Northern communities have also contributed to the "nutritional transition" facing Canada's Inuit from traditional foods to processed foods, especially in younger generations (Kuhnlein et al. 2004, Sharma 2010, Sharma et al. 2010a). This rising consumption of non-traditional food items has implications for food security but also obesity, diabetes and cancer, all of which are pressing health issues in these populations (Anctil 2008, Kelly et al. 2008, Egeland et al. 2010b, Egeland et al. 2011). However, consumption of processed food was found not to be a significant predictor of food security in

our study. The fact that consumption of both country food and processed food were not associated with a food secure status suggests that there might not be that great of a divide between the consumption of the two types of food. Inuit in Iqaluit might rely on both types depending on their relative availability and cost. The fact that there are many Inuit migrants in Iqaluit who do not participate in a food sharing network or have access to a hunter might also explain their consumption of both locally harvested and imported food (Lardeau et al. 2011), although was not tested here.

Food security in Iqaluit does not seem to significantly differ by season. Unlike smaller communities, Iqaluit's economy is primarily wage-based and less dependent on hunting and other harvesting activities, which are heavily dependent on climatic conditions (Searles 2002, Searles 2010b). Therefore, food security in Iqaluit may not be directly tied to seasonal changes in hunting conditions, as the income obtained from waged employment allows households to purchase store food rather than depend solely on the harvest of country food (Caulfield 2000, White et al. 2007).

Our results suggest that the factors that affect the vulnerability of households to food insecurity may be different in large and small Inuit communities in Canada. Unlike previous research in smaller settlements, we found that consumption of country foods did not appear to be associated with improved food security among Inuit. Furthermore, gender was not a significant predictor of food security, which differs from previous work suggesting that women were more vulnerable to food insecurity. Education, employment and socio-economic status, which were the dominant predictors of food security here, may be particularly important in larger centers of the North, and thus have greater similarities with predictors of food security in southern Canada. The results provide timely insights for food policy in Nunavut, which has been identified as a priority by different levels of government, communities, and activists (Wakegijig et al. 2013), and emphasizes the unique needs of larger settlements.

Broad-level barriers to addressing food insecurity in Nunavut

Inuit have experienced significant cultural changes since initial contact with European settlers and explorers in the 17th century, changes that accelerated in the mid-20th century. Basing their relationships to the Inuit in imperialism Europeans used political, economic and cultural tactics to swiftly establish a cultural hierarchy and solidify the Inuit's position as 'The Other' – an 'out-group' viewed as inherently inferior to the 'in-group'. The Arctic has remained hierarchized because of implicit settler colonial processes that permeate political and cultural relations and underpin modern policy development. An examination of the nutrition transition brings these implicit settler colonial processes into focus. The transition to a Western diet has provoked chronic poverty and high levels of food insecurity, resulting in numerous negative health outcomes among Inuit. Current health promotion initiatives employ an ineffective downstream approach to reduce Nunavut food insecurity – which currently sits at approximately three times the Canadian average – when the issue is a result of high rates of poverty. Disproportionately high rates of food insecurity are a manifestation of settler colonialism and fuel a covertly racist national attitude toward Inuit, maintaining their marginalized position. This study examined national coverage of Nunavut food insecurity as presented in two of Canada's most widely read newspapers: The Globe and Mail and National Post. A critical discourse analysis (CDA) suggests national print media propagates the Inuit's position as The Other by selectively reporting on social issues such as hunger, poverty and income. Terms such as "Northerners" and "Southerners" are frequently used to categorically separate Nunavut and the Inuit from the rest of Canada. Media reports focus on social problems such as food insecurity, while Inuit-driven efforts to resolve their own issues are widely ignored. This effectively portrays the Inuit as helpless and the territory as a failure. Furthermore, it allows Canadians to maintain the colonial view of the Inuit, and erroneously assume initiatives developed primarily by the Federal Government are effectively addressing Northern food insecurity.

Community food program use in Kuujjuaq

Despite there being a large number of food support programs in Kuujjuaq, there are gaps in the ‘system’ or network supporting household food security. The majority of food support mechanisms in operation today use store food access as the means through which to address food insecurity issues in the population. Income plays a significant role in getting access to enough which to address food insecurity issues in the population. Income plays a significant role in getting access to enough nutritional food in Nunavik, based on the existence of programs’ focus to address this issue. Individual programs require detailed review. Methods for the evaluation of food support programs (including an analysis of the contribution of community freezers in Nunavik to household food security status is now being developed and conducted in 2013-14) are being developed and implemented to look at the associations between accessing support mechanisms and household food security status for use in Kuujjuaq and transferable to other communities. This information will provide the foundation for recommendations to support programs to be presented to the NRBHSS / NNHC.

Key considerations for health adaptation (based on Ford et al. in press, AJPH)

In this work we argue that adaptation has been largely neglected within the health research and practitioner community. This has to change. In this paper, we aim to initiate and inform debate on health adaptation for Inuit populations by outlining key considerations for adaptation programming based on our understanding of the key drivers of climate change vulnerability in a Northern context, along with principles of adaptation planning developed in the general scholarship. While these considerations cut across impacts, risks, and regions, and target key drivers of vulnerability consistently identified in our work and that of others, they are not meant to be a definitive list. Health adaptations should always be designed to meet local requirements and respond to local socio-cultural contexts, and responses specific to particular risks and community needs will also be required. Developing

an evidence base of adaptation, therefore, is an urgent need.

Adaptation encompasses a variety of strategies and actions that make households and societies more resilient to climate change. These can be broadly categorized as focusing on better management of existing climatic risks, identifying opportunities to enhance cultural and institutional capacity to respond to changes in existing risks, or transformational change to manage future conditions that are projected to be quite different from today (Brooks et al. 2011). In this work we focus on the first two categories, in which adaptation is about doing things we should already be doing but better, tackling pathways that lead to ill-health, building upon traditional knowledge and cultural values, and targeting the social determinants of health which are the root causes of many climate-related health vulnerabilities. These characteristics of decision-making are pertinent where there are many pressing issues besides climate change, and can help demystify adaptation bringing it to familiar territory for policy makers. Such actions will require leadership by actors within the public health sector, but will also need concerted collaborative action with other sectors and across jurisdictions at local to national scales.

Building adaptive capacity / resilience to manage climate change impacts is central to the lessons documented, with our aim to initiate debate on how we can dynamically plan in the context of existing conditions and anticipated, but largely unknown, social, economic, and environmental changes. Some scholars, however, have argued that enhancing adaptive capacity will not be enough in light of dramatic climate change projections, which will necessitate transformative adaptation (Adger and Barnett 2009, Smith et al. 2011, O’Brien 2012). While we agree that ‘tipping points’ caused by climate change could fundamentally shift the Arctic’s ecological system (Barnosky et al. 2012) and must be considered, we also believe that immediate and better-understood health risks should be amongst our first risk management priorities. This position is justifiable given the already-present and extensive need for

health services in Inuit communities, our research-based understanding of existing risks and associated interventions, and the ability to adapt current programs to accommodate increased magnitude and frequency of anticipated changes.

Future research needs to comprehensively evaluate opportunities for health adaptation, and examine the effectiveness, desirability, feasibility, urgency, and durability of adaptations, under both current and projected future climatic and socio-economic conditions. It is imperative that adaptation evaluation is done in active and meaningful collaboration with communities, organizations, and government, that it integrates insights from science and traditional knowledge, and emphasizes locally-appropriate approaches to adaptation assessment.

Conclusion

The issue of food security is now firmly only the policy agenda across Canada's Inuit regions, and decision makers have identified the importance and need for research to help inform policy. This ArcticNet project is working closely with Regional Inuit Centres (RICs), decision makers at multiple levels, and scientists to examine the food security challenges faced by segments of the populations believed to be at highest risk, yet neglected in previous research. The first three years of the project have been primarily focused on developing an understanding of the use of food programs, and characterizing the vulnerability of high risk groups to food insecurity in-light of climate change. Our publications are indicative of the scientific value and contributions of the work, while our strong community and policy maker collaborations speak to the focus of the project on creating 'usable science' (Ford et al., 2013). In the last year we have begun to interpret the findings in the context of what is needed to strengthen food programming to address the challenges posed by climate change. We have made recommendations already, and will continue to do so in the final year, along with advancing our implementation of pilot initiatives in partner

communities (leveraging significant co-funding to this end).

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