One Health
Operationalizing One Health in the Arctic

Achievements Report
May 2017
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BACKGROUND AND MOTIVATION

One Health is a theoretical concept and practical approach for developing and sustaining broad interdisciplinary collaboration – to identify, prevent, and mitigate health risks in humans, animals and the environment. Recognizing that ecosystem linkages and interdependencies necessitate a holistic approach to health issues is a core tenet of One Health.\textsuperscript{1,2,3,4} A One Health approach therefore, requires diverse experts and wide ranging stakeholders in addressing the complex health issues at the human-animal-ecosystem interface.

The Arctic is known for being both rugged and resilient due in part to persistent cold temperatures and the largely frozen conditions of the land and sea. Indigenous Peoples of the Arctic have a long history of resilience to the variability of Arctic conditions. However, the current magnitude and rate of climate change in the Arctic is posing new challenges. Arctic temperatures have risen at twice the rate of other parts of the world resulting in decreased sea ice, coastal erosion, changes in precipitation magnitude and frequency, permafrost thawing, and altered distribution of animal species.\textsuperscript{5,6,7,8} The associated health risks for the millions of humans and animals that call the Arctic home include potential changes in pathogen proliferation and vector borne disease, degradation of drinking water and food quality and availability, and changes in animal species distribution, among others.\textsuperscript{5,6,7,8} Activities undertaken through this project have identified even more phenomena that would benefit from a One Health approach, including wildfires and other natural disasters.

The Arctic’s health is further at risk from environmental contaminants. Contaminants generated outside the Arctic region including heavy metals and persistent organic pollutants are transported by manmade and natural mechanisms to the Arctic where they bio-accumulate and enter the food chain, harming various animal species, including humans who depend on wildlife for food.\textsuperscript{9,10}

As ice-free periods increase and there is greater access to the Arctic, maritime traffic will increase the risk of sudden and catastrophic release of contaminants, while resource extraction activities will present additional contamination risks.\textsuperscript{11}

Health threats will evolve in types, frequency, severity and complexity as the dynamic impacts of climate change on the Arctic ecosystems unfold.\textsuperscript{12,13,14} Efforts to identify and understand the risks will require innovative science, novel tools and approaches that integrate input from multidisciplinary and diverse sets of knowledge holders. Such collaborations will advance the fundamental understanding of emerging health threats and can spur the development of initiatives that decrease vulnerabilities of communities and ecosystems.

One Health is a particularly well-matched tool to advance the understanding of health threats from the direct and indirect impacts of climate change in the Arctic. As a multidisciplinary approach, One Health strengthens coordination between and among a wide range of scientific disciplines and stakeholders. One Health enhances participatory community-based approaches
for identifying and responding to health issues in communities, which take into account traditional and local knowledge (TLK).

The Arctic provides an optimal opportunity for regional operationalization of One Health. As a concept, if not an operational norm, One Health is already evident in the Arctic and circumpolar north. There is a strong tradition of local national, regional, and international cooperation among diverse stakeholders in addressing human, animal and ecosystem health issues. Second, there are demonstrated programs and systems working in close collaboration that include multi-disciplinary science communities, research institutes, academia, non-governmental agencies, the private sector, civil societies, native communities, and other stakeholders. Arctic health stakeholders are experienced at integrating collaborative scientific and policy development across disciplines, cultures, and borders. Third, networks are in place to coordinate different aspects of Arctic health, ecosystem monitoring, animal and human disease surveillance, and reporting. Fourth, there is recognition of the need for an operational multi-disciplinary and holistic model for assessing all health risks. Finally there is a track record of policy makers receptive to, and influenced by scientific research from diverse scientific discipline.

Transboundary Arctic collaborations related to One Health are grounded in longstanding traditions and cultures of the Arctic region, as well as in more recent Arctic diplomacy. One Health was recognized in 1957 with the establishment of the Nordic Council committee for Arctic Medical Research. In 2010, the Sustainable Development Working Group created the Arctic Human Health Expert Group (AHHEG) for a human health perspective in addition to environmental issues. The Charter of the AHHEG is to advance collaboration between all stakeholders on integrated efforts to attendant human health issues with knowledge gained through ecosystem and community based research. In 2011, the Arctic States issued the Nuuk Declaration, which describes the prioritized areas of concern and actions on health issues. While One Health is not specifically identified, the declaration principles are aligned with the tenets of a One Health approach. Most recently, the International Circumpolar Working Group (ICWG) identified six activities to be established to strengthen the integration of animal and human health systems in order to minimize disease emergence in the Arctic.

In short, the concept of One Health has been iteratively advanced by Arctic stakeholders, scientists and policy makers for decades – and by Arctic communities dating back thousands of years. Operationalizing a One Health model supports advancement of the fundamental understanding of climate change vulnerabilities and impacts on Arctic health and provides an even stronger evidence base for developing decision making tools, frameworks and sound policies that can a) identify One Health issues early; b) implement prevention programs; and c) design mitigation and resilience-building strategies.

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x. AMAP, 2011. Arctic Pollution 2011: Mercury. Arctic Monitoring and Assessment Programme (AMAP), Oslo. vi + 38pp


xiv. AMAP, 2009. Arctic Pollution 2009. Arctic Monitoring and Assessment Programme, Oslo. xi+83pp

xv Parkinson, Alan J ; Evengard, Birgitta ; Semenza, Jan C ; Ogden, Nicholas ; Børresen, Malene L ; Berner, Jim ; Brubaker, Michael ; Sjöstedt, Anders ; Evander, Magnus ; Hondula, David M ; Menne, Bettina ; Pshenichnaya, Natalia ; Gounder, Prabhu ; Larose, Tricia ; Revich, Boris ; Hueffer, Karsten ; Albihn, Ann. Climate change and infectious diseases in the Arctic: establishment of a circumpolar working group. International journal of circumpolar health, 2014, Vol.73, pp.25163


xxi. Parkinson, Alan J; Evengard, Birgitta ; Semenza, Jan C ; Ogden, Nicholas ; Børresen, Malene L ; Berner, Jim ; Brubaker, Michael ; Sjöstedt, Anders ; Evander, Magnus ; Hondula, David M ; Menne, Bettina ; Pshenichnaya, Natalia ; Gounder, Prabhu ; Larose, Tricia ; Revich, Boris ; Hueffer, Karsten ; Albihn, Ann. Climate change and infectious diseases in the Arctic: establishment of a circumpolar working group. International journal of circumpolar health, 2014, Vol.73, pp.25163


xxiv. Ibid
OVERVIEW

OBJECTIVE OF PROJECT

To operationalize a One Health approach in the Arctic by forging co-equal, inclusive collaborations across multiple scientific disciplines and Arctic communities, to enhance resiliency of the Arctic inhabitants through an enhanced understanding of climatic change impacts on health risks to people, animals, and the environment.

ACTIVITIES AND OUTPUTS:

Activities to Date

The project undertook the phased approach outlined below. These phases are part of an integrated systematic approach to operationalizing One Health; the order in which these are listed does not necessarily reflect the temporal sequence of implementation, nor does it reflect a priority hierarchy:

1. The leadership team developed a strategy for implementing an Arctic One Health approach. The strategy reflected the need to include both:
   a. Technical experts from a range of disciplines (health, environment, wildlife and land management, agriculture, meteorology, etc.)
   b. Political or policy-oriented representation from Arctic States and Permanent Participants

2. With strong input and participation from AHHEG, the team implemented and evaluated the results of a One Health Survey to obtain the current status of One Health in the Arctic, and to identify hurdles and opportunities in operationalizing a circumpolar One Health approach. The survey garnered 334 unique respondents from all Arctic states; the data set is thought to be one of the largest of its kind in the world. Survey results are described starting on page 12.

3. The project team scheduled, initiated and participated in a series of Arctic regional knowledge-sharing workshops on priority technical matters (e.g., epidemiology, disease surveillance, environmental science, invasive species, food security and the One Health Model). The aims of these events included:
   a. Provide a forum for cross-sectorial dialogue focused on establishing an operational Arctic One Health Program
   b. Identify the current landscape of One Health activities in the Arctic
c. Bolster commitments from key national and community institutions to designate One Health hubs, as POCs for future collaborative activities.

d. Identify ways to promote and measure progress towards the operationalization of One Health.

4. The team convened the first-ever Arctic Council One Health Table Top Exercise (TTX). TTXs are designed to incorporate multiple perspectives on how complex processes work – for example, the response to a marine mammal unusual mortality event or a wildfire. TTXs also allow for the identification of gaps in knowledge or understanding in these processes – as well as the development of action plans to address these gaps. The University of Minnesota and the U.S. Department of Agriculture used their “One Health Systems Mapping and Analysis Resource Toolkit” (OH-SMART™) to implement the TTX. These findings will inform the creation of One Health Hubs and international, intersectoral teams engaged in Arctic One Health Collaborative Projects.

Anticipated Future Developments:

In October 2016, SDWG approved an extension of the project through the Finnish Chairmanship of the Arctic Council (2017-2019). Specific activities from 2017-2019 may include:

1. Designation of One Health Hubs (also known as “Centers of Excellence” or “Points of Contact”). Hubs can allow simplified communications in the event of a trans-boundary or circumpolar One Health event, and can provide a framework for future capacity building and coordination activities. One Health Hubs will be connected to form an informal Arctic One Health Network.

2. Launch of Arctic One Health Collaborative Projects, in line with identified priorities and needs. Such activities will be reported to AHHEG and SDWG as they occur, so that they can be effectively captured in the Arctic Council’s meetings and documents.

INTEGRATION OF TRADITIONAL AND LOCAL KNOWLEDGE (TLK):

A participatory, community-based approach is at the core of the One Health. Such an approach consults TLK holders, takes into account TLK, and uses TLK to identify and respond to health issues. The Indigenous peoples of the circumpolar region possess immense understanding of their environments and ecosystems based on millennia of living close to nature. Additionally, TLK holders’ perceptions of and relationships with the environment, are important elements of cultural identity - a key facet of physical and mental health. TLK holders - including TLK holders from Arctic Council Permanent Participant organizations - were heavily involved throughout the past two years of the project, most notably in responding to the survey and in the Table Top Exercise. TLK holders’ continued involvement in the project through the 2017-2019 period will be essential to its success.
TLK contributes to the Operationalizing One Health project in multiple ways.

- Reliability and consistency of One Health assessments and findings.
  - TLK is based on observations made by local experts who know intimately the wildlife, people and environment. As a result, TLK is critical for recognizing and characterizing real change, as opposed to occasional or random events.

- A more comprehensive One Health risk-assessment and risk-management process.
  - TLK informs discussion about emerging threats, advancing collaborations, prioritizing actions, and informs the process of planning for and responding to phenomena that benefit from a One Health approach.

- A more holistic analysis of the link between climate change and the impact on the lives of Arctic communities, animal populations, and ecosystems.
  - TLK includes unique perspectives that contribute to the assessment and understanding of the effects of climate change on wildlife health, biodiversity, and ecosystems – and the impact that such changes have on communities’ health and well-being.

- TLK contributes to advancing the knowledge of One Health by informing scientific research and improving the strength of the findings of such research.

- TLK supports more effective prevention and mitigation/resiliency-building measures, by informing the community acceptability and suitability of such measures.

**SURVEY RESULTS**

*The AHHEG-led One Health survey was crucial to the success of this project. The project leads wish to thank Arctic Council member states and Permanent Participants for their outstanding efforts in disseminating the survey across the Arctic region. A brief summary of the survey’s key findings is shared here. Separately, the project team has synthesized the data and created an extended monograph, which is being prepared for publication later in 2017.*

**EXECUTIVE SUMMARY:**

A computer-based survey was undertaken by the Arctic Council’s Arctic Human Health Expert Group to assess the baseline inventory of self-identified One Health practitioners, initiatives and programs, and to assess the level of interest in enhancing the One Health approach among survey responders. **Knowledge of, experience with, and interest in the One Health approach in the Arctic region was investigated by the Arctic One Health survey instrument consisting of**
26 multiple-choice and open ended questions. Known individuals with Arctic One Health knowledge were invited to participate in the online survey, and were then asked to forward the survey to up to three professional or personal Arctic region contacts.

Five main topic areas were investigated. These included: (1) understanding of the One Health approach; (2) cataloguing and characterizing One Health type activities; (3) how and why individuals and organizations use the One Health Approach; (4) challenges/hurdles in applying the One Health approach; and, (5) interest in the One Health approach. Each topic area was explored with supporting survey questions. The questions were adopted from the One Health Systems Mapping and Analysis Resource Toolkit (OH-SMART\(^1\)), and then adapted for the Arctic Survey by the members of the Arctic Council’s Sustainable Development Working Group, the Arctic Human Health Expert Group, and Arctic human, animal and environmental health subject matter experts. The questions were uploaded into the Survey Monkey\(^\circledast\) and distributed only in English. All the data collected was exported to an Excel file for analysis.

An initial qualifying question was asked to ensure the target population respondents were included. After removing those disqualified, there were a total of 334 responders completing all or parts the Arctic One Health Survey. The total number of responders by self-identified organizational affiliation included individuals (11), government (100), industry (31), international body (4), Non-governmental organization (44), not identified (12), Permanent Participants (34), and, university (96). Total number of responders by self-identified country included Austria (1), Canada (82), Denmark (5), Finland (6), France (1), Greenland (11), Iceland (7), Italy (1), Netherlands (1), Norway (20), Not Identified (9), Poland (1), Russia (8), Sapmi (1), Sweden (4), United Kingdom (1), and USA (175). The following are key findings by topic area.

- **Understanding of the One Health Approach**
  - 51% of responders were aware of the concepts of the One Health approach; while only 13% of responders had received training in One Health.
  - 13% of responders indicated leadership in One Health is *nice, but not necessary*; 5% indicated *leadership in One Health is needed only at senior levels* within an organization; while 23% indicated that leadership in One Health is *needed at all levels in an organization*. These percentages were also consistent across organizational affiliation and country.

- **How, Why Individuals and Organizations Use a One Health Approach**
  - 26% of responders identified *access to needed expertise* as the factor motivating them to work with other agencies; 24% identified that they *can better achieve job responsibilities by working with other agencies*; and, 23% identified that ensuring *coordination on messages and communications to stakeholders* as the leading factor motivating working with other agencies.

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The three most frequent activities identified by responders to promote collaboration among agencies included developing joint programs or working on joint projects with colleagues from other agencies (19%); alerting colleagues from other agencies when issues arise (19%); and holding regular meetings with colleagues from other agencies (18%).

The most frequently identified reasons responders chose NOT to include other agencies were when they felt it doesn’t directly involve other agencies area of responsibility (31%); when they felt the other agency would not be interested in the information or in coordinating (18%), when the responders did not know the right person to contact (12%), and when the responders thought it would take too long or add too many challenges to include them (12%).

Catalog and Characterize One Health Activities

Of 148 responses, 33% indicated agencies have functions or offices designated as One Health, 39% indicated no One Health Office or function; 27% were not aware if they had one or not.

44% of responders indicated they had not applied and/or received funding for a One Health research or operational project or program, while 6% indicated they have applied and/or received funding for an identified One Health research or operation project or program. 49% of total responders did not answer this question.

Overall, 4% indicated that a One Health vision is identified in their agency mission statement; 2% identified that their agency had a One Health vision developed, but not implemented; 12% responded that components/sections of their agency had a One Health vision; and 17% of responders indicated their agency had no One Health vision.

The leading purpose for the majority of responders working with other agencies was to improve communication and information sharing between agencies (22%) and to maintain situational awareness of issues facing community or region (22%); implement regular (day to day) duties / operations (18%); and develop communication strategies/materials for the public (14%).

552 responses were provided identifying the three partners/agencies that responder’s agency collaborates with on health issues. Of the 552 responses, there were 270 unique agencies/organizations identified. The Alaska Native Tribal Health Consortium, Public Health Canada and universities were most frequently identified as collaborative partners by the responders.

Challenge and Opportunities in the One Health Approach

10% of responders indicated their agency did not do well in promoting collaboration on health issues with other agencies; 30% responded their agency did moderately well; 18% indicated their agency did very well; and 16% indicated their agency did extremely well.
The most serious challenges to working more effectively with other agencies were identified as barriers related to hierarchy or institutional structure (17%), a lack of a clear process (16%) and key partners not being known (15%).

16% of responders indicated that no One Health leadership was demonstrated at any levels of their agency; 17% indicated that One Health leadership was demonstrated within sections or components of their agency, and 4% indicated that One Health leadership was demonstrated at senior levels of their agency.

Responders identified increasing One Health program/project funding, increased meetings and opportunities to interact on One Health projects and greater cooperation among agencies as the three key actions that would foster greater inter-agency collaboration.

**Interest in the One Health Approach**

95% of the responders identified an interest in actively participating in One Health collaborative activities with international partners, these included: Research (20%); Community Outreach (18%); Policy Development (15%); Professional Network Development (18%); Educating the Next Generation of Arctic One Health Leaders (13%); and a Leadership Role in Regionalizing an Arctic One Health approach (10%)

Responders provided 147 recommendations on how interagency collaboration could improve tackling health aspects of climate change resiliency in their community. Overall the responses centered on enriching expertise through interdisciplinary cooperation, and supporting and strengthening regional efforts through the sharing of techniques, programming and solutions that seem to effectively address health issues of climate change.

Climate change, which some experts have identified as the greatest global health threat of the 21st century, will pose challenges to the public health community at the global, national, and local levels. These challenges are already evident in the Arctic where Indigenous and non-indigenous Arctic communities are already experiencing climate change effects such as reductions in sea ice thickness, thawing permafrost, increases in coastal erosion, alterations in the ranges of some fish and land animals, and increased weather unpredictability, among other impacts. Improved understanding of the human health dimensions of climate change on all Arctic inhabitants will advance the capacity to prevent, respond and cope with changes. A regional One Health approach addressing the potential health effects at the human-animal-environment interface will contribute to enhancing the resilience of Arctic communities.

The Arctic One Health survey is the first to assess the evidence of a holistic approach health issues in the Arctic. Analysis of the responses to the survey provides meaningful evidence of the One Health mindset across the Arctic. The results point toward an opportunity to build on the expertise of diverse One Health stakeholders to operationalize an Arctic One Health network that will enhance international cooperation in the Arctic. Utilizing an interdisciplinary approach to health-related topics in the Arctic allows us to better develop research and public health
programs that ultimately lead to better prevention, treatment, and education on public health issues.

Further, as trans-disciplinary One Health approaches gain more attention globally, the findings from this survey could provide a foundation for analysis in other regions. Policy makers, citizens, and scientific experts wishing to adopt One Health approaches can use this survey as a framework to help them evaluate current challenges and opportunities for enhancement of current One Health approaches and for the development and implementation of One Health initiatives.
<table>
<thead>
<tr>
<th>Awareness of the One Health Approach</th>
<th>How, Why Individuals and Organization’s use One Health Approach</th>
<th>Catalog and Characterize One Health Activities</th>
<th>Challenge/hurdles in One Health approach</th>
<th>Interest in the One Health Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you aware of the One Health approach?</td>
<td>Which of the following best describes the factors that motivate you to work with other agencies?</td>
<td>Does your agency have functions, activities or offices designated as “One Health”?</td>
<td>What 3 key actions would foster greater inter-agency collaboration?</td>
<td>Would you be interested in participating in collaborative activities with international partners?</td>
</tr>
<tr>
<td>Where did you first hear about the One Health approach?</td>
<td>What specific activities do you personally do, to promote collaboration among agencies?</td>
<td>Have you applied and/or received funding for an identified One Health research or operation project or program?</td>
<td>How well does your agency currently promote collaboration on health issues with other agencies?</td>
<td>Would you be interested in participating in a Workshop? (Table Top Exercise, seminar, etc.)</td>
</tr>
<tr>
<td>Have you received One Health training or participated in One Health symposia, training activities, or workshops?</td>
<td>What specific activities does your supervisor do to promote collaboration among agencies?</td>
<td>To what extent does your agency have a shared vision for One Health?</td>
<td>What are the three biggest barriers that you experience that prevent you from working more effectively with other agencies?</td>
<td>In your view, how would inter-agency collaboration contribute to tackling health aspects of climate change resiliency in your community?</td>
</tr>
<tr>
<td>Which of the following statements most accurately describes your beliefs about leadership in One Health?</td>
<td>When do you choose NOT to include other agencies in your work?</td>
<td>What is the primary purpose for the majority of your work with other agencies?</td>
<td>To what extent is One Health leadership demonstrated at all levels of your agency?</td>
<td></td>
</tr>
<tr>
<td>Which One Health topics do you believe are most relevant to your community?</td>
<td>List the three key partners/agencies involved in collaboration with your agency on health issues</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Arctic One Health Survey topic areas and supporting questions.
Circumpolar knowledge and information sharing activities were a hallmark of this project. Several such activities are described below.

**JOINT ARCTIC COUNCIL HEALTH EXPERT GROUPS MEETING - OULU, FINLAND, JUNE 8, 2015**

The Arctic Council has two health expert groups: the SDWG AHHEG and the Arctic Monitoring and Assessment Program’s Human Health Assessment Group (AMAP HHAG). The two groups leveraged the 2015 International Congress on Circumpolar Health (ICCH) in Oulu, Finland to convene a joint meeting and discuss shared priorities. The meeting was co-chaired by Tom Hennessy of SDWG AHHEG and Jon Øyvind Odland of AMAP HHAG. During the meeting, One Health was identified as a key area of overlap and collaboration between the two expert groups. Several specific challenges and opportunities were identified.

Challenges included:

- Difficulties harmonizing locally observed phenomena into a total picture of One Health across the Arctic region.
- Combining “two eyes”: synthesizing both Indigenous and non-indigenous view on important issues
- Different approaches for disseminating risk communication in scientific and community-based circles, including the challenge of balancing scientific results and clear public health messaging
- Ethical issues regarding continuous research projects on small populations, and how to message unclear or divergent results of such projects
  - Conversely, a best practice is to include local communities in the formulation of the survey and the dissemination of results

General opportunities included:

- Sharing knowledge and building partnerships in conferences and joint meetings for the benefit of local knowledge and development
- Applying the progression identified in the *Operationalizing One Health* project to move towards greater circumpolar collaboration on One Health
- Creating a visual “map” of the Arctic Council system for easy access to key persons, knowledge and cooperation
- Harness innovation and understand its impact on political priorities.
Opportunities related to *Operationalizing One Health* included:

- Use community-based environmental monitoring to understand baseline states and illuminate changes or threats
- Recognizing that One Health is approached in different ways in different places, gather knowledge on these different approaches to compare and support further cooperation
- Identify key points to assess the baseline situation and communicate potential impact of change in the development context
- Use socio-economic as well as environmental indicators to improve understanding of the local situation
- Emphasize linkages between One Health and the previously-identified issues of food and water security
- Use innovations such as filter paper for monitoring biological pathogens and chemical contaminants in subsistence animals

**AHHEG ONE HEALTH SESSION - ANCHORAGE, AK, USA, OCTOBER 20, 2016**

AHHEG convened its first-ever virtual meeting in October 2016, to allow for a greater focus on the One Health project. Dr. Hennessy and Dr. Ruscio were present; the session was then digitally captured and posted online (http://www.sdwg.org/expert-groups/arctic-human-health-expert-group/). AHHEG members who were not present had 10 days to engage with the online presentation in a “chat room” format. The early date of the session generated enthusiasm for the project, as well as feedback on how to proceed with the progression of activities outlined for the project.

**CIRCUMPOLAR ARCTIC FULBRIGHT CONFERENCE - HANOVER, NH, USA, JAN 11-12, 2016**

The U.S. Department of State’s Arctic Fulbright Initiative convened a conference on the campus of Dartmouth University in January, 2016. A key theme of the meeting was Arctic health. A member of the *Operationalizing One Health* project team was invited to participate in the meeting; Dr. Ruscio traveled on behalf of the group. The conference occurred while the project’s survey was on-going, allowing for dissemination of the survey link and information about who should respond. Participants also provided crucial feedback on the design of the project, including ways to ensure that scientific knowledge and TLK were appropriately represented. A brief summary of the meeting is available at: https://medium.com/our-arctic-nation/week-5-new-hampshire-70c2c17ad612#.1m8t7hmkw
ARCTIC SCIENCE SUMMIT WEEK - FAIRBANKS, AK, USA, MARCH 15, 2016

The SDWG leveraged Arctic Science Summit Week in Fairbanks, AK to convene a briefing of One Health experts from academic and scientific institutions. The afternoon-long briefing drew approximately 15 participants from a range of academic disciplines. In addition to a presentation from the SDWG project team on the Operationalizing One Health project, the briefing included a presentation on the Local Environment Observer (LEO) network and its web-based tools for noting anomalous events of One Health concern. The session featured remarks from the University of Alaska-Fairbanks administration about the university’s One Health programs of study and research. Faculty members also had an opportunity to identify key areas that would merit further research and international collaboration.

ALASKA FORUM ON THE ENVIRONMENT - ANCHORAGE, AK, USA, FEBRUARY 9, 2017

The Alaska Forum on the Environment (AFE) is one of the primary gatherings of environmental scientists and environmental health practitioners. The project team was afforded the opportunity to deliver a three-part presentation (https://event.crowdcompass.com/alaskaforum/activity/3UwkI4sZMe). Mike Brubaker of ANTHC spoke about ANTHC’s Local Environmental Observer program, and ways local observers can help to provide early warning and feedback regarding observed One Health phenomena. Dr. Tom Hennessy of the U.S. CDC spoke about emerging One Health challenges in the Arctic, and ways that the practice of One Health can close gaps in addressing the health implications of these phenomena. Josh Glasser of the U.S. Department of State described the SDWG project and the progression of steps towards operationalizing One Health in the Arctic region. Santina Gay of the U.S. EPA moderated the session, which was attended by approximately 40 participants. The session was captured by a professional live graphic recording artist:
Pictured (left-right): Brubaker, Glasser, Hennessy. Photo credit: Gay. Artistic credit: Anne Jess
**TABLE TOP EXERCISE**

**DESCRIPTION**

*What is a Table Top Exercise (TTX)?*

In a TTX, stakeholders are assembled in a common space and presented with a hypothetical One Health scenario, such as a disease outbreak that has implications for humans and animals, a wildfire, or a mass die-off of wildlife. Stakeholders – who are selected to represent a diversity of backgrounds, disciplines, sectors, and levels of governance – are then asked to formulate a response plan. For example, they may be asked who they would communicate with, what tasks they would undertake and in which sequence, and so on. A master trainer guides the process and ensures that there is space for everyone to participate.

*Why are TTXs helpful?*

TTXs are a critical tool for understanding and strengthening how people from different sectors work together on problems of human, animal, plant, and environmental health. The exercises are also designed to build a network of trained participants who can effectively address One Health challenges locally, nationally, and regionally – and who are certified as master trainers to conduct TTXs in their home communities. While several TTX tools have been created, the One Health Systems Mapping and Analysis Resource Toolkit (OH-SMART) is proven and has been used in the United States and internationally to strengthen coordination between potential partners. More information on OH-SMART - including a video demonstration - is available here: [http://foodprotection.umn.edu/one-health-smart](http://foodprotection.umn.edu/one-health-smart)

*Who Should Participate in a TTX?*

TTXs only work if participation is diverse – with participation from all Arctic states, Permanent Participant organizations, and levels of governance (community leaders, local governments, state/provincial governments, national governments, civil society). Arctic Council observers are also welcome. Some stakeholders that may find the activity valuable include:

- Traditional and Local Knowledge Holders, including youth and elders
- Public health physicians or emergency responders
- Veterinarians
- Environmental regulators
- Managers of land, sea, and/or air resources
- People engaged in hunting, trapping, fishing, or animal husbandry
- Climatologists and meteorologists
- People engaged in shipping or transport
- People engaged in international commerce or diplomacy
**Inputs Required For Conducting a TTX**

Four basic ingredients make a TTX work:

1. A host, to provide the venue
2. A coordinator, to identify participants and arrange the delegation’s travel
3. A master trainer, to facilitate the activity
4. A funder, to provide financial support

**Expected Outputs**

Deliverables from the TTX include:

- A flow chart, showing how the participants response to the hypothetical scenario
- A written summary of the meeting, including a description of the gaps/bottlenecks identified via the flow chart
- A set of participants who possess master trainer certification, and who are equipped to conduct TTXs using the OH-SMART method in their home communities

**Anticipated Outcomes/Vision**

- Participants can articulate gaps/bottlenecks in the One Health process that are relevant to their own contexts, and consider strategies for overcoming these challenges
- Capacity is in place for TTXs and real-time One Health projects in Arctic communities
- International and interdisciplinary networks of One Health scientists and practitioners strengthen and expand
- One Health leaders (a.k.a., “focal points” or “hubs”) emerge
- Potential avenues for future Arctic One Health collaboration are identified

**PARTICIPANTS**

A Table Top Exercise was held in Anchorage, AK, USA, from February 1-3, 2017. More than 40 participants attended and represented four Arctic states (Canada, Finland, Kingdom of Denmark, and the United States) and two Permanent Participant organizations (Aleut International Organization, Inuit Circumpolar Council).

Participants came from a variety of backgrounds, including public health, food safety, medicine and veterinary medicine, meteorology, wildlife and land management, and emergency response. The training included a “train-the-facilitator” activity on Day 1, followed by a two day mapping and action planning exercise.

The project team would like to express its appreciation to all those that took part in this path-breaking exercise.
AGENDA

Day 1: OH-SMART™ Table Top Exercise Implementation Training

Day 1

Topics

8:30-9:30  Welcome and Introductions
Overview of One Health Systems Approach and the OH-SMART™ Process

9:45-12:00  Overview of Networks and Stakeholder Interviews, Participatory Leadership skill practice (OH-SMART™ Steps 1 & 2)

12:00 – 1:00  LUNCH

1:00-2:30  Overview of Process Mapping and Analysis of the One Health System (Steps 3 & 4)
Group practice

2:45- 4:00  Overview of Shared Decision Making and Action Planning (Steps 5 & 6)
Review, Planning for Days 2 and 3 (table top exercise implementation)

Day 2 and 3: Tabletop Exercise

Day 2

Topics

8:30 – 9:30  Welcome Back and (Re) Introductions
Scenario Introduction

9:45 – 12:00  Group Discussions and Interviews
Table Reports

12:00 – 1:00  LUNCH
Group work: Scenario Mapping and Analysis

1 – 4:30
Table Reports – Sharing Experiences
Closing Circle

Day 3
Topics

8:30-8:45
Welcome Back, Review

Group work: Finish Scenario Mapping and Analysis

8:45 – 12:00
Group work: Action Planning
Table Reports – Sharing Experiences

12:00 – 1:00
LUNCH

1:00 – 4:30
Group Work: Action Planning
Table Reports and Group Discussion

**SCENARIO**

Participants were given a brief prompt to kick-start the exercise. The prompt was designed to be detail-limited, as the purpose was to simulate the vague and uncertain nature of One Health phenomena. Participants were explicitly prompted not to follow official operating procedures, but rather to discuss their perspectives on how a response to the event would unfold. The prompt given to participants read as follows:

It’s been an abnormally warm year across the Arctic, and a particularly hot summer. Numerous coastal communities are reporting dead and dying marine mammals in unusual numbers – primarily ice seals, but also other species, including walrus. People have also seen dead seabirds, and are worried whether a recent harmful algal bloom or the hot weather might be to blame, or if this is another infectious disease outbreak. They are especially concerned about whether their subsistence foods are safe to eat.
In inland communities, people are worried about the increasing risk of forest fires, and warnings of extreme fire danger have been issued. A large forest fire begins at the end of summer, as harvested subsistence foods are being prepared for storage. It spreads quickly, and becomes the largest in recent memory. Air quality becomes very poor, and the fires threaten key life-supporting infrastructure such as water sources and food cellars. These impacts in turn threaten the health of people in the communities closest to the fire as well as in cities farther away. Animal health is also threatened, and some communities need to be evacuated.

Questions during the mapping exercise:

Detecting and Responding to the Marine Mammal die off:
2. What do they do with that information? Who would initially be notified?
3. At what point is the die-off officially designated an ‘unusual mortality event’?
4. What samples might be collected from the dead marine mammals or seabirds? Where would they be sent for testing? Who would be notified of the results?
5. What action would different results of the tests trigger? Who would be involved?

Detecting and Responding to the Forest Fire:
1. Which agencies or organizations are monitoring fire danger?
2. How would the initial fire be reported and responded to?
3. Who monitors air quality during the fires, and what (if any) measures do they take to notify the public about health risks?
4. How are communities warned of the need to evacuate?
5. What happens during the evacuation to food and water supplies? To any pets or working animals?
6. Who is involved in an evacuation?

SUMMARY REPORT

The OH-SMART™ tool asks participants to simulate who would be involved in response to a precipitating One Health event, such as the ignition of a wildfire or the observation of dead marine mammals on a beach. Participants construct their individual maps of the process, drawing a “lane” for each stakeholder and drawing shapes and arrows to describe, for example, who would be included at which stage and how information would flow. Participants are then asked to merge their individual maps with those of other participants, who come from a different agency, community, sector, or country. The areas where there are uncertainties or discrepancies between individuals’ maps are flagged using square adhesive notes. These areas become the focus of discussion and action planning for improving the process moving forward. An example of a map is show here:
Through the activity, the participants identified a variety of challenges and strategies for overcoming those challenges. A summary of their comments and feedback is included here.

Some of the challenges related to the OH-SMART™ tool itself. The tool had never before been used in an Arctic context, and some of the training materials lacked a “lane” for community groups or tribal organizations. Training organizers noted this gap, and have made plans to strengthen the tool moving forward by including these features.

Other challenges related to the different types of systems in place for dealing with One Health incidents. For example, the acute stage of wildfire management is typically addressed via centrally-directed “incident command systems”, whereas the longer-range impact of such events on ecosystems, wildlife, and food security do not have such systems. Several groups of participants used the workshop to identify bridge points between incident command and sustained impact monitoring, assessment, and rehabilitation. For some incidents, such as marine mammal mortality events, there is typically no “incident command system” – so an
operational One Health network could fill an existing gap. Participants also identified where more work can be done to identify and address certain impacts of die-off events, such as food insecurity and nutritional decrements for subsistence communities, and mental health of subsistence hunters or fishers.

Another challenge related to trans-boundary One Health events. In some parts of the Arctic, there are well-established systems in place for exchanging information across international boundaries (these arrangements may also provide for the exchange of people and response materials). In other contexts, there is little transboundary communication and there may be few relationships or mechanisms for promoting such communication. The degree to which personnel and supplies can move across borders also varies greatly throughout the Arctic. Remoteness, personnel turnover, and language differences compound these challenges in some areas, making it difficult to detect when an event may be underway. However, this limitation also implies that international and circumpolar collaboration can generate benefits for detecting and responding to such events. As organizations with trans-boundary membership, Permanent Participant organizations were recognized as particularly crucial stakeholders.

Communication and coordination challenges may also exist within countries, especially where there are limits in resources and personnel, bureaucratic challenges, or mistrust between key actors. Even where the spoken language is the same, different communities and agencies may have different ways of understanding, describing, and responding to One Health events. In some locales, legal frameworks are such that points of contact and response functions lie with different agencies for different species of marine mammal. The OH-SMART™ tool trains facilitators to recognize “the danger of a single story” and the importance of understanding multiple points of view, as a way of circumventing these challenges. Additionally, participants identified human and veterinary laboratory associations and networks within and beyond the Arctic that could advise on coordination and communication challenges.

Some participants also noted that there may be differences in how scenarios and maps are constructed, depending on who convenes and facilitates the meeting. For example, a national government agency may frame the scenario or map in one way, where as a Permanent Participant organization or local community may do so in a different way. These frames may influence how other participants provide information into the process. To address these issues, several participants expressed interest in further mapping sessions hosted at the community level, with government agencies invited to join and provide input. The facilitators also noted that the OH-SMART™ tool allows for creating a “map of maps” where multiple maps from different groups are combined into a master map, encompassing more points of view.

The session included strong participation from university partners, so there was extensive discussion about the role of academia in One Health events. Several participants recognized the value that academic institutions could add to a response – particularly in measuring the effectiveness of interventions. However, academic research is sometimes perceived as
deliberative and thus ill-suited to acute event response. Participants noted the value of pre-existing partnerships between academics, communities, and practitioners to allow for better mutual understanding reduce some of these barriers. Academic institutions also play a role in training and building the capacity of future One Health practitioners, and can serve as neutral conveners in cases where there may be mistrust or competition among other stakeholders.

A number of participants also discussed the challenge of ensuring accuracy of information. Traditional and social media, as well as local observer networks, government agencies, and civil society can all provide critical information for operationalizing One Health, but there may be challenges in parsing out “signals” from “noise” and determining which events are both authentic and of One Health concern. Under- and over-reaction both present risks, so participants emphasized the value of clear, accurate, actionable information and right-sizing the response to that information. They also emphasized the importance of communities both as “first observers” and “first responders” to One Health events.

New technologies pose both a challenge and an opportunity for One Health. In certain acute events, such as wildfires, participants noted that the unregulated use of unmanned aerial vehicles (UAVs) can complicate effective aerial response. However, other technologies (such as improved satellites) can provide better situational awareness, and can be used to inform early warning. Remote sensing can also help to survey affected areas after the acute event has ended (for example, after wildfires burn vegetation, the area is considered to be at risk for flooding events for up to five years.) Participants identified multiple avenues for improving information sharing and awareness regarding the changing technology environment.

Finally, participants discussed ways for disseminating the results of the TTX. In addition to this summary report, several participants expressed interest in authoring peer-reviewed or mass media publications, highlighting the maps that were created, the issues that were flagged as challenges, and the action plans that were formed. Several participants also expressed their intention to re-run TTXs using the OH-SMART™ tool in their home agencies or communities in the near future.
Given the high-profile nature of the issues covered and the heavy emphasis on public engagement, this project has resulted in a number of conference, peer-reviewed, and mass media publications:

A peer-reviewed paper on Arctic One Health was published in the International Journal of Circumpolar Health in September 2015. (http://www.circumpolarhealthjournal.net/index.php/ijch/article/view/27913). Other publications and presentation abstracts - including results from the survey - are also being drafted for peer review.

While it was in-progress, the survey was profiled by CBC News (Canada): http://www.cbc.ca/news/canada/north/arctic-council-one-health-survey-1.3434844

An article on the initiative also ran on the World Policy Blog (http://www.worldpolicy.org/blog/2016/06/30/one-arctic-one-health-arctic-health-challenges-era-rapid-change).

The project was presented at the AMAP International Conference on Arctic Science: Bringing Knowledge to Action; April 24-27, 2017 Reston, Virginia, USA

CONFERENCE SUMMARY:
Building on the 2011 Arctic Messenger of Change Conference held in Copenhagen, Denmark, the 2017 International Conference on Arctic Science: Bringing Knowledge to Action decision-making and policy-relevant information across a broad array of different Emphasis will be on what state-of-the-art research is now telling us about present and future change within the Arctic- and its implications for policy- and decision-making. Organized to include plenary and breakout sessions covering both disciplinary and interdisciplinary perspectives, results from the various sessions will be used in shaping future science priorities and strategies across the Arctic Council’s six Working Groups

Accepted Abstracts:

Abstract #1: Arctic One Health Approach

Employing an international diplomatic forum to advance regional engagement on emerging public health challenges in the Arctic
There is increasing recognition of the interconnectedness of human health to animal and ecosystem health. This has led to the development of “One Health”, an interdisciplinary approach to understanding and responding to these complex health challenges. Examples include the emergence of zoonotic diseases driven by changes in human behavior, animal vectors and climate. Increasing numbers of governments are issuing policy guidance on One Health, and One Health has been recognized as a process by which diverse state and non-state actors can collaboratively engage to position and prioritize health issues more prominently in policy decision-making. A framework for multi-stakeholder collaborative engagement is critical to advancing cooperation on Arctic health issues because climate change and emerging health threats reach across borders and Arctic nations share common aspects of vulnerable communities and ecosystems.

The Arctic Council, comprised of the eight countries with territory in the Arctic as well as six “Permanent Participant” organizations representing Indigenous groups, is a unique venue for bolstering health resiliency by operationalizing the international practice of One Health. While local and national discourses within the Council’s member states – and past declarations of the Council – have long recognized the concept, work is now underway to operationalize the practice of circumpolar One Health. We review the arguments for a circumpolar One Health approach that informs regional researchers, enhances networks of practitioners, provides avenues for health diplomacy, and generates evidence for robust policymaking. We describe the process and steps of employing an existing international forum, the Arctic Council, to initiate a five-stage process to regionalize the One Health approach in the Arctic. We characterize the current status of initiative implementation and upcoming follow-on steps, and examine some of the main technical, policy, and diplomatic complexities in operationalizing a circumpolar One Health approach.

We conclude with a summary of how a One Health approach can strengthen co-operation and collaboration between Arctic nations, subject-matter experts, traditional and local knowledge holders, and other Arctic stakeholder co-operatives; and promote the translation of research into evidence-based policy. Such actions and decisions have the potential to improve the health of Arctic peoples and further the sustainable development of this rapidly changing region. The information offered in this presentation may also prove helpful to those engaged in advancing trans-boundary One Health efforts elsewhere.

Abstract #2: Arctic One Health Survey

The “One Health” concept is an interdisciplinary approach to understanding and responding to threats at the interface of human, animal and environmental health. From January 1 to March 31, 2016, the Arctic Council’s Arctic Human Health Expert Group undertook a computer-based survey to assess the baseline inventory of self-identified One Health practitioners, initiatives and programs in the Arctic, and to assess the level of interest in enhancing the One Health
community of practice among survey responders. The 26 multiple-choice and open-ended
questions queried knowledge of, experience with, and interest in the One Health approach in
the Arctic region. The survey was administered using Survey Monkey®. The survey used an
exponential, non-discriminative chain referral sampling: known, Arctic-based, One Health-
knowledgeable individuals were electronically invited to participate, and then asked to forward
the survey to up to three professional or personal Arctic regions contact.

Five main One Health topic areas were explored in this survey. These areas included; (1)
understanding of the one Health approach; (2) cataloguing and characterizing One Health
activities; (3) how, why individuals and organizations use the one Health Approach; (4)
challenges / hurdles in applying One Health approach; and, (5) interest in the One Health
approach moving forward. Each topic area was explored with supporting survey questions. (See
Table). The questions were formulated based on the One Health approach and multidiscipline
collaborations and adopted from the One Health Systems Mapping and Analysis Resource
Toolkit (OH-SMART)xxv. These questions were vetted by the members of the Arctic Council’s
Sustainable Development Working Group, the Arctic Human Health Expert Group, and subject
matter expert and Arctic Stakeholders in the US and Canada. Next, the questions were then
uploaded into the Survey Monkey®. The Survey was distributed only in English. All the data was
collected by the Survey Monkey and then exported to an Excel file.

A qualifying initial question asking responders, “over the past five years, have you lived in,
worked in, or done research in the Arctic Region” - to ensure the target population respondents
were included. Responders answering “No” were disqualified and exited from the survey.2
Section I of the survey instrument consisted of introductory information, stated the purpose of
the survey and provided background and contact information. Section II of the survey
instrument provided directions for taking the survey, and Section III of the survey instrument
consisted of the 26 actual survey questions.

After removing disqualified responders, there were a total of 334 responders completing all or
parts the Arctic One Health Survey. By self-identified organization of affiliation responders
included as individuals (11); government(100); industry(31); international body(4); Non-
governmental organization(44); not identified(12); Arctic Council Permanent Participant
organization members(34); and, university(96). By self-identified country, responders included
Austria(1); Canada(82); Denmark(5); Finland(6); France(1); Greenland(11); Iceland (7); Italy(1);
Netherlands(1); Norway(20); not Identified(9); Poland(1); Russia(8); Sapmi (1); Sweden(4);
United Kingdom(1); and, USA (175). The following are key findings by topic area.

\[2\] For the purpose if this survey, the Arctic region includes the northern territories of the eight Arctic states, and
consists of the Arctic Ocean and parts of the United States, Canada, Finland, Greenland (Kingdom of Denmark),
Iceland, Norway, Russia, and Sweden.
**Understanding of the One Health Approach**
51% of responders were aware of the concepts of the One Health approach; while only 13% of responders had received training in One Health.

13% of responders indicated leadership in One Health is *nice, but not necessary*; 5% indicated leadership in One Health is *needed only at senior levels* within an organization; while 23% indicated that leadership in One Health is *needed at all levels* in an organization. These percentages were also consistent across sub-groups of organizational affiliation and country.

**How, Why Individuals and Organizations use One Health Approach**
26% of responders identified *access to needed expertise* as the factor motivating them to work with other agencies; 24% identified that they *can better achieve job responsibilities by working with other agencies*; and, 23% identified that *ensuring coordination on messages and communications to stakeholders* as the leading factor motivating working with other agencies. The three most frequent activity identified by responders to promote collaboration among agencies included *developing joint programs or working on joint projects with colleagues from other agencies* (19%); *alerting colleagues from other agencies when issues arise* (19%); and, *holding regular meetings with colleagues from other agencies* (18%).

The most frequently identified reasons responders chose NOT to include other agencies were when they felt *it doesn’t directly involve other agencies area of responsibility* (31%); when they felt the *other agency would not be interested in the information or in coordinating* (18%), and when the responders *did not know the right person to contact* (12%), and when the responders *thought it would take too long or add too many challenges to include them* (12%).

**Catalog and Characterize One Health Activities**
Of 148 responses, 33% indicated agencies have functions or offices designated as One Health, 39% indicate no One Health Office or function; 27% were not aware if they had one or not. 44% of responders indicated they had not applied and/or received funding for a One Health research or operational project or program, while 6% indicating they have applied and/or received funding for an identified One Health research or operation project or program. 49% of total responders did not answer this question.

Overall, 4% indicated that One Health vision is identified in their agency mission statement; 2% identified that their agency had a One Health vision developed, but not implemented; 12% responded that components/section of their agency had a One Health vision; and, 17% of responders indicated their agency had no One Health vision.

The leading purpose for the majority of responders working with other agencies was *to improve communication and information sharing between agencies* (22%) and *to maintain situational awareness of issues facing community or region* (22%); *implement regular (day to day) duties/operations* (18%); and *develop communication strategies/materials for the public* (14%).
552 responses were provided identifying the three partners/agencies that responder’s agency collaborates with on health issues. Of the 552 responses, there were 270 unique agencies/organization identified. The Alaska Native Tribal Health Consortium, Public Health Canada and universities were most frequently identified as collaborative partners by the responders.

**Challenge and Opportunities in the One Health Approach**

10% of responders indicated their agency did not do well in promoting collaboration on health issues with other agencies; 30% responded their agency did moderately well; 18% indicated their agency did very well; and, 16% indicated their agency did extremely well.

The most serious challenges to working more effectively with other agencies were identified as barriers related to hierarchy or institutional structure (17%), a lack of clear process (16%) and key partners not being known (15%).

16% of responders indicated that no One Health leadership demonstrated at any levels of your agency; 17% indicate that One Health leadership demonstrated within sections or components of the agency, and 4% indicated that One Health leadership was demonstrated at senior levels of the agency.

Responders identified increasing One Health program/project funding, increased meetings and opportunities to interact on One Health projects and greater cooperation among agencies as the three key actions that would foster greater intra-agency collaboration.

**Interest in the One Health Approach**

95% of the responders identified an interest in actively participating in One Health collaborative activities with international partners, these included: Research (20%); Community Outreach (18%); Policy Development (15%); Professional Network Development (18%); Educating Next Generation of Arctic One Health Leaders (13%); and A Leadership Role in Regionalizing an Arctic One Health Approach (10%)

Responders provided 147 recommendations on how interagency collaboration could improve tackling health aspects of climate change resiliency in their community. Overall the responses centered on enriching expertise through interdisciplinary cooperation.

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<table>
<thead>
<tr>
<th>Awareness of the one Health Approach</th>
<th>How, Why Individuals and Organization’s use One Health Approach</th>
<th>Catalog and Characterize One Health Activities</th>
<th>Challenge/hurdles in One health approach</th>
<th>Interest in the one health Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you aware of the One Health approach?</td>
<td>Which of the following best describes the factors that motivate you to work with other agencies, in general?</td>
<td>Have you applied and/or received funding for an identified One Health research or operation project or program?</td>
<td>What 3 key actions would foster greater inter-agency collaboration?</td>
<td>Would you be interested in actively participating in One Health collaborative activities with international partners?</td>
</tr>
<tr>
<td>Where did you first hear about the One Health approach?</td>
<td>What specific activities do you personally do, to promote collaboration among agencies?</td>
<td>Does your agency have functions, activities or offices designated as “One Health”?</td>
<td>How well does your agency currently promote collaboration on health issues with other agencies?</td>
<td>Would you be interested in participating in a Workshop, Table Top Exercise, seminar, etc.?</td>
</tr>
<tr>
<td>Have you received One Health training or participated in One Health symposia, training activities, or workshops?</td>
<td>What specific activities does your supervisor do to promote collaboration among agencies?</td>
<td>To what extent does your agency have a shared vision for One Health?</td>
<td>What are the three biggest barriers that you experience that prevent you from working more effectively with other agencies?</td>
<td>In your view, how would inter-agency collaboration contribute to tackling health aspects of climate change resiliency in your community?</td>
</tr>
<tr>
<td>Which of the following statements most accurately describes your beliefs about leadership in One Health</td>
<td>When do you choose NOT to include other agencies in your work?</td>
<td>What is the primary purpose for the majority of your work with other agencies?</td>
<td>To what extent is One Health leadership demonstrated at all levels of your agency?</td>
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</tr>
<tr>
<td>Which One Health topics do you believe are most relevant to your community?</td>
<td>List the top three key partners/agencies involved in collaboration with your agency on health issues</td>
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Table 1: Arctic One Health Topic Areas and Supporting Survey Questions
CONCLUSION

SUMMARY

One Health is an approach for understanding phenomena that have implications for human, animal, and environmental health. Examples of One Health phenomena include novel infectious disease outbreaks, unexplained wildlife mortality events, chemical contamination issues, and natural disasters such as wildfires. Owing in part to the Arctic’s many subsistence-oriented communities and cultures and the rapid pace of environmental change, operationalizing One Health has been recognized as a key strategy for enhancing resilience in the Arctic region. The Sustainable Development Working Group (SDWG) endorsed Operationalizing One Health at its October 2015 meeting, with the United States and Canada serving as co-sponsors.

OUTPUTS AND OUTCOMES:

The survey and knowledge-sharing aspects of the project have generated a large data set and significantly increased the dialogue regarding One Health across the Arctic region. This dialogue has included mass media as well as Arctic Council and peer-reviewed scientific channels.

The Table Top Exercise generated a number of outputs, including:

- Four flow charts, where participants mapped how a response to a hypothetical scenario would work – with unclear/discrepancy “gap” areas flagged for review
  - Flagged gaps were converted into action plans for participants to use in addressing these gaps moving forward
  - The flow charts and action plans is being considered for a future publication by meeting participants
- A written summary of the meeting, provided on page 26 of this Report.
- A set of approximately 40 participants trained in the OH-SMART™ methodology
  - Several of these participants expressed intention to facilitate their own table top exercises in their home communities

The project team further anticipates several outcomes, to be realized as the project continues:

- Project participants can articulate gaps/bottlenecks in the One Health process that are relevant to their own contexts, and consider strategies for overcoming these challenges
• Capacity is in place for TTXs and real-time One Health projects in Arctic communities
• International and interdisciplinary networks of One Health scientists and practitioners strengthen and expand
• Standard Operating Procedures (SOPs) begin to develop for on-going cooperation between relevant inter-sectoral and international institutions/organizations
• One Health leaders (a.k.a., “focal points” or “hubs”) emerge
• Potential avenues for future Arctic One Health collaboration are identified and projects to investigate or respond to observed phenomena commence.

FORWARD-LOOKING RECOMMENDATIONS

As a result of the project activities outlined above, the project team has identified eight forward looking recommendations. These recommendations were approved by the Sustainable Development Working Group at their February 2017 meeting in Kotzebue, AK, USA:

1. The Arctic Council and SDWG should continue to promote One Health as a critical strategy to regional resilience.

2. One Health approaches are already well-established at local levels in much of the Arctic, but the Arctic Council and SDWG work should promote stronger international and circumpolar cooperation, including via sharing of knowledge, simulating One Health events and responses, and investigating observed One Health phenomena. In particular, the Arctic Council and SDWG should continue to benefit from the extensive Traditional and Local Knowledge (TLK) of Indigenous communities and Permanent Participants: TLK is deeply connected to any meaningful understanding and practice of One Health in the Arctic region.

3. One Health is a well-recognized concept among participants in the SDWG One Health project survey, knowledge sharing activities, and Table Top Exercise. Future Arctic One Health efforts should build from this base of strong grassroots awareness and leadership.

4. Table Top Exercises are critical for understanding how One Health approaches work in practice and how stakeholders would like them to work under ideal circumstances. The Arctic Council, SDWG, Member States, Permanent Participants, Accredited Observers,
Arctic communities should promote regular and recurring Table Top Exercises, as a tool for continued capacity building and relationship strengthening.

5. One Health Hubs/Points of Contact (POCs) can facilitate cooperation within and between countries in the Arctic region on One Health projects. Arctic Council member states, Permanent Participants, and Accredited Observers should identify and empower hubs/POCs to promote identification and development of circumpolar One Health hubs.

6. While knowledge sharing, education events and simulated events (such as TTXs) are essential, there is no substitute for concrete One Health collaborative activities on the ground. The Arctic Council, SDWG, Member States, Permanent Participants, Accredited Observers, and Arctic communities should promote opportunities for increased international collaborative investigations of One Health phenomena in the circumpolar region. These investigations should be – to the greatest extent possible – grounded in the observations of local observers, and should include “after-action” activities to assess good practices and lessons learned, to be shared not only with One Health stakeholders but also with Arctic Council stakeholders engaged in resilience activities more broadly.

7. Local environmental observing is essential for identifying events that may have One Health implications for further analysis. One Health hubs should be sensitive to and responsive of locally-observed phenomena. Moreover, results of One Health investigations and analysis should cycle back to observers in the form of data sharing, risk communication, and community involvement in decision making.

8. One Health depends on collaboration between communities, governments, and nongovernmental institutions such as businesses, nonprofit groups, and academia. SDWG should continue to engage nongovernmental groups in future One Health projects and activities.