

A Contribution to the International Polar Year

CIRCUMPOLAR HEALTH
SUPPLEMENTS



2010 (6)

Arctic Human Health Initiative

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International Association of Circumpolar Health Publishers:

Danish-Greenlandic Society for Circumpolar Health and Greenland Institute of Health Research, Institute for Circumpolar Health Research, International Network for Circumpolar Health Research, International Union of Circumpolar Health, Nordic Society for Arctic Medicine, University of Alaska, Anchorage, University of Manitoba, University of Oulu, University of Tromsø

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Supplement Orders:

International Association of Circumpolar Health Publishers
Aapistie 1, FI-90220 OULU, Finland

ijch@oulu.fi
www.ijch.fi

ISSN 1797-2361 (print)
ISSN 1797-237X (online)

Layout Privat-Medi, cover design Elina Aronen-Raappana

Circumpolar Health Supplements 2010; 6

International Association of Circumpolar Health Publishers:

Danish-Greenlandic Society for Circumpolar Health and
Greenland Institute of Health Research,
Institute for Circumpolar Health Research,
International Network for Circumpolar Health Research,
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Original text: Alan J. Parkinson
Cover design: Elina Aronen-Raappana
Layout: PrivatMedi, Finland
Printing: Laatupaino, Raahe, Finland

ISSN 1797-2361 (print)
ISSN 1797-237X (online)

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Supported by:



A Project of the Arctic Council's Sustainable Development Working Group

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PREFACE

This *Circumpolar Health Supplement* reports on the progress of the Human Health Initiative an Arctic Council Sustainable Development Working Group International Polar Year (IPY) project, and serves as a deliverable marking the completion of the Norwegian Chairmanship (from 2006 until March 2009).

The IPY (2007-2008) is the 4th major international polar research program intended to provide a venue for expanding the boundaries of our understanding of the Polar regions. However, in contrast to previous polar years (1882-83, 1932-33, 1957-58) the 4th polar year for the first time focused significant attention on the human dimension of Arctic research and in particular the concerns of indigenous peoples including human health.

Human health concerns and challenges of Arctic peoples include the health impacts of environmental contaminants, climate change, and rapidly changing social and economic conditions. They also include the changing patterns of chronic diseases, the high rates of injuries, and the continuing health disparities that remain between the indigenous and non-indigenous segments of Arctic populations.

Because the Arctic Council is an intergovernmental forum that promotes cooperation and coordination between all eight Arctic countries on common concerns including sustainable development and environmental protection and includes the active participation of, and full consultation with, Arctic Indigenous peoples organizations, it is a unique organization with the potential to influence national policies to address these health concerns and improve the health of Arctic peoples.

The IPY presented a unique opportunity for the Arctic Council to focus world attention on the Arctic, and to increase the visibility of the health concerns of Arctic peoples. Proposed in 1996, the Arctic Human Health Initiative was a United States led, Sustainable Development Working Group IPY project that aimed to build on and expand human health interests of the Arctic Council and the International Union for Circumpolar Health. It is hoped that the legacy of the AHHI will be to increase the visibility of human health concerns of Arctic peoples and to revitalize cooperative Arctic human health research focused on those concerns. It is hoped that this effort will result in the development and implementation of health policies that will improve the health of Arctic peoples.

An objective of the AHHI is to catalog and monitor the progress of human health projects and activities that were initiated during the IPY. This report provides an overview of projects and activities proposed during the IPY and the Norwegian chairmanship of the Arctic Council which ended March 31, 2009. Many of these proposals developed into research projects during the IPY because of national interest and the availability of new

funding programs dedicated to human health research activities, or because agencies and organizations redirected resources and in-kind support to ensure the success of the human health initiative. Some, however, remain unfunded and inactive. Results from much of the research conducted over the IPY are still pending and consequently the full impact of the IPY and the AHHI will not be known for some years to come.

The author wishes to thank the AHHI steering committee for their support and advice: James E. Berner, M.D. Alaska Native Tribal Health Consortium, Anchorage, Alaska, US; Pam Orr MD, Department of Medicine, Health Sciences Center, Manitoba, Canada; Kue Young Department of Public Health Sciences, Faculty of Medicine University of Toronto, Canada; Anders Koch MD, Department of Epidemiology Research, Statens Serum Institute, Copenhagen, Denmark; Andrew Kozlov, Institute of Developmental Physiology, Russian Academy of Education, Moscow Russian Federation; Sergey Krivoschekov, Institute of Physiology SB RAMS, Novosibirsk, Russian Federation; Arild Vaktskjold, Norway; Jon Øyvind Odland, M.D, PhD, Tromsø University, Institute of Community Medicine, Tromsø, Norway; Juhani Hassi MD, Ph.D., Institute of Health Sciences, University of Oulu, Oulu, Finland; Karla Williamson Inuit Tapariit Kanatami, Ottawa Ontario, Canada

AHHI could not be successful without the support, advice and encouragement of individuals from the following organizations:

- Centers for Disease Control and Prevention, Arctic Investigations Program, Anchorage, Alaska
- The University of Alaska, Anchorage, Alaska
- The University of Alaska, Fairbanks, Alaska
- Alaska Pacific University, Anchorage, Alaska
- The National Institutes of Health, International Relations, Fogarty International Center, Bethesda, Maryland
- The National Institutes of Health, National Library of Medicine, Bethesda, Maryland
- The US State Department, Office of Oceans Affairs, Bureau of Oceans and International Environmental and Scientific Affairs, Washington DC
- Canadian Institute for Health Research, Institute for Aboriginal Peoples Health, University of Victoria, British Columbia, Canada
- Northern Secretariat, Health Canada, Ottawa, Ontario, Canada
- Environmental Health Surveillance Division, Health Canada, Ottawa, Ontario, Canada
- Russian Association of Indigenous Peoples of the North (RAIPON), Moscow, Russian Federation

- Gwitch'n Council International
- Inuit Circumpolar Conference
- Aleut International Association, Anchorage, Alaska
- Northern Forum, Secretariat, Anchorage Alaska
- Department of Otolaryngology, Head and Neck Surgery Rigshospitalet
University Hospital of Copenhagen
- Department of Public Health and General Medicine, University of Oulu, Finland
- Center for International Health, University of Tromsø, Norway
- Office of the Medical Officer of Health, Nuuk, Greenland
- National Public Health Laboratory, Oulu, Finland

Financial Support for the AHHI was provided by:

The Centers for Disease Control and Prevention, Atlanta Georgia

The US State Department, Office of Oceans Affairs, Bureau of Oceans and International
Environmental and Scientific Affairs, Washington DC

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INTRODUCTION

The International Polar Year

The International Polar Year (IPY) is an intensive multidisciplinary program of collaborative international science, research, education and communication focusing on the Arctic and Antarctic regions. The years 2007-2008 mark the 50th anniversary of the International Geophysical Year and the third IPY. This event has been designated the 4th IPY by the National Academy of Science, the International Council of Science, the World Meteorological Organization, the Arctic Council and many other international organizations. This period of focused scientific activity promises to “further our understanding of the physical and social process in polar regions, examine their globally connected role in the climate system and establish research infrastructure for the future, it will serve to attract and develop a new generation of scientists and engineers with the versatility to tackle complex global issues” www.ipy.org. In contrast to previous polar years, the IPY 2007-2008 has a much wider scientific scope including for the first time fields of direct societal importance, such as ecosystem and human health, and the development of indigenous societies and economics.

The Arctic Council formally recognized the International Polar Year 2007-2008 as a unique opportunity to further stimulate cooperation and coordination on Arctic research and increase awareness and visibility of the Arctic region in the *Reykjavik Declaration-2004* (1). Subsequently, the Ministers encouraged the expansion of IPY projects to include the human dimension, the inclusion of Arctic residents and indigenous peoples in IPY planning and conduct of research activities, the strengthening of monitoring and research efforts to address Arctic change and the creation of a circumpolar Arctic observing network of monitoring stations with coordinated data collection and information exchange for data analysis as a legacy of the IPY. (*Salekhard Declaration-2006*) (2).

The IPY provided an opportunity for the Arctic Council to take a leadership role by supporting research activities that will address the human health concerns of Arctic communities and set the stage for an integrated approach to Arctic human health research beyond 2009.

Human health in the Arctic

Life expectancy in Arctic populations has greatly improved over the last 50 years. For example, in 1950, the life expectancy at birth for an Alaska Native, the indigenous people of Alaska was 47 years compared with 66 years for the general U.S. population (3). By 2000, the life expectancy for Alaska Natives had increased to 69.5 years, a gain of over 20 years. Much of this improvement can be attributed to implementation of prevention and treatment activities that have resulted in reductions in morbidity and mortality from infectious diseases, such as tuberculosis, and the vaccine preventable diseases of childhood. Reductions in infectious disease mortality for Alaska Natives have been especially dramatic. For example in 1950, 47% of deaths among Alaska Natives were due to infections, as compared with only 3% for non-Native Alaskans. By 1990, infectious diseases caused only 1.2% of the Alaska Native deaths, very similar to the 1% seen for non-Natives (3). In addition, public health research led to innovations including the provision of safe water supplies, sewage disposal, and development of community based medical providers, contributing to improved care and access to care for injuries and illness. Research on the negative health effects of tobacco has led to tobacco cessation and education programs. Mortality rates for heart disease and overall cancer rates are similar in Arctic indigenous residents in relation to overall rates for the US, Canada, and northern European countries, with some exceptions (i.e. higher incidence of gastric, nasopharyngeal, renal cancers) not explained by known risk factors (4).

Despite improvements in these health indicators life expectancy is shorter and infant mortality rates higher among indigenous arctic residents in the US Arctic, northern Canada, and Greenland compared with Arctic residents of Nordic countries. For example, life expectancy for Alaska Natives still lags behind the general U.S population which was 76.5 years in 2000. Similarly, indigenous residents of US Arctic and Greenland have higher mortality rates for injury and suicide and hospitalization rates for infants with pneumonia and respiratory infections; these disturbing health disparities will only be solved with greater understanding of their causes through research and focused efforts at prevention (4).

The rapid pace of change across the Arctic present new challenges to the health and wellbeing of Arctic residents and requires additional health research. Some of the major trends likely to affect the health status of Arctic peoples include economic changes, improved transportation and communications, environmental pollutants and climate change.

Living conditions are changing from an economy based on subsistence hunting and gathering to a cash-based economy. Across the circumpolar north there is increasing activity towards sustainable development via local resource development and widening involvement in the global economy. The influence of such changes on the physical health of Arctic residents on the one hand have been positive, resulting in improved housing conditions, a more stable supply of food, increased access to more western goods, and decreases in morbidity and mortality

from infectious diseases. However, changes in lifestyle brought on by the move away from traditional subsistence hunting and gathering and societal changes brought on by modernization have resulted in an increase in prevalence of chronic diseases such as diabetes, hypertension, obesity and cardiovascular diseases. In addition, child abuse, alcohol abuse, drug abuse, domestic violence, suicide, unintentional injury are also associated with rapid cultural change, as well as loss of cultural identity and self esteem (4, 5).

Globalization has meant improvements in transportation infrastructure and communications technologies such as the internet and telemedicine. Many previously isolated communities, are now linked to major cities by air transportation, and are only one airplane ride away from more densely populated urban centers. Consequently these communities are now vulnerable to the importation of new and emerging infectious diseases (such as influenza, SARS or SARS like infectious diseases, and antibiotic-resistant pathogens such as multi-drug resistant tuberculosis) (6).

Environmental contaminants are a global problem. Contaminants such as mercury, other heavy metals, PCBs, DDT, dioxins and other organochlorines mainly originate in the mid-latitude industrial and agricultural areas of the globe but have migrated to the Arctic via atmospheric, river and ocean transport. Their subsequent bio-magnification in the Arctic food webs and appearance in subsistence foods such as fish, waterfowl, marine and land mammals, and the indigenous people who rely on these foods is of great concern to Arctic residents. Potential human health effects include damage to the developing brain, endocrine and immune system. A new concern is the role of mercury on cardiovascular diseases. Research is needed to identify the levels and human health effects of these contaminants in arctic residents, particularly the very young, and to use research to provide guidance on both the risks and benefits of consuming traditional foods (7, 8, 9).

The changing climate is affecting Arctic communities, and is bringing economic and health threats, as well as possible opportunities. The impacts of climate change on the health of Arctic residents will vary depending on factors such as age, socioeconomic status, lifestyle, culture, location and adaptive capacity of the local health infrastructure systems. It is likely that the most vulnerable will be those living a traditional lifestyle close to the land in remote communities, and those already facing health related changes. Direct health related impacts, for example may include an increase in injuries, hypothermia, and frostbite related to travel, unpredictable ice and weather conditions, and heat stress in summer. Indirect impacts include the potential changes in the distribution of vector borne diseases such as West Nile virus, zoonotic infectious diseases such as brucellosis, tularemia or echinococcosis, changes in access to safe water supplies, failure of the permafrost and damages to the sanitation infrastructure, as well as changes in the traditional food supply as the migration patterns of subsistence species change in response to changing habitats. Research is needed to identify climate sensitive indicators that will allow the prediction of health impacts and the development of mitigation strategies (10, 11, 12).

While these challenges seem great, the Arctic is unique in many aspects and has a long history of cross border cooperation on issues of concern to Arctic communities.

Circumpolar cooperation on Arctic human health

There is a long history of international cooperation on many issues affecting Arctic communities including human health and human health research.

The International Union for Circumpolar Health (IUCH) is a non-governmental organization comprised of an association of five circumpolar health organizations: the American Society for Circumpolar Health, the Canadian Society for Circumpolar Health, the Nordic Society for Circumpolar Health, the Siberian Branch of the Russian Academy of Sciences, Medical Section, and the Danish Greenlandic Society of Circumpolar Health. The IUCH promotes circumpolar collaboration and cooperation through the activities of 13 working groups in different fields of health and medicine (www.iuch.net). Outreach education and communication are provided through the publication of the International Journal of Circumpolar Health, and the hosting of the triennial International Congress on Circumpolar Health (ICCH), held most recently July 12-16, 2009 in Yellowknife NWT Canada. The IUCH is an Observer on the Arctic Council, and provides a source of experts covering all areas of Arctic human health.

The International Arctic Social Sciences Association (IASSA) draws membership from disciplines relating to behavioral, psychological, cultural, anthropological, archaeological, linguistic, historical, social, legal, economic, environmental, and political subjects, as well as health, education, the arts and humanities, and related subjects. IASSA promotes international cooperation and increased participation of social scientists in national and international Arctic research. The organization also promotes communication and coordination with other research organizations and facilitates the active collection, exchange, dissemination, and archiving of scientific information in the Arctic social sciences (www.iassa.gl).

The International Network for Circumpolar Health Research (INCHR) (www.inchr.com) is a voluntary network of individual researchers, research trainees, supporters of research based in academic research centers, indigenous people's organizations, regional health authorities, scientific/professional associations, and government agencies, who share the goal of improving health of the residents of the circumpolar regions through international cooperation in scientific research. INCHR conducts, sponsors, and promotes research programs and projects investigating the patterns, determinants and impact of health conditions among circumpolar peoples and strategies for improving health; supports research training at all levels and increases the capacity for circumpolar health research in communities, service delivery agencies and higher educational institutions; facilitates exchange, communication and dissemination of research data; and strengthens the health information system in circumpolar regions.

The Northern Dimension (ND) Partnership in Public Health and Social Wellbeing (NDPHS), (www.ndphs.org) established in 2003, has a membership of 12 countries (Canada, Denmark,

Estonia, Finland, France, Germany, Iceland, Latvia, Lithuania, Poland, Russia, Sweden) and 8 affiliated organizations. The aim of the NDPHS is to promote sustainable development in the ND area by improving human health and social wellbeing through intensified and enhanced cooperation. Priorities include: 1) the reduction of major communicable diseases and prevention of lifestyle related non communicable diseases (including HIV/AIDS and tuberculosis, use of illicit drugs, cardiovascular diseases and consequences of socially distressing conditions); 2) the promotion of healthy and socially rewarding lifestyles (including determinants of health and social wellbeing, such as sexual behavior, alcohol use, smoking, use of illicit drugs, peoples work and social environments and skills).

The Barents Euro Arctic Region (BEAC) established the Barents Euro Arctic Council Cooperation Program on Health and Related Issues in 2003. The BEAC (www.beac.st; www.barentshealth.org) membership includes regions in northern Norway (Nordland, Tromsø, Finnmark), Finland (Lapland, Oulu, Kainuu), Sweden (Norrbotten, Västerbotten), and northwestern Russian Federation (Murmansk, Karelia, Arkhangelsk, Komi, Nenets). The Working group on Health and Social Issues is chaired by Norway and Murmansk (2006-2007). Priorities include: 1) prevention of communicable diseases; 2) prevention of lifestyle and related health and social problems, and promotion of healthy lifestyle's; and 3) development and integration of primary health care and social services. Multilateral programs include HIV/AIDS prevention and control (2004-present), and Children and Youth at Risk (new in 2007).

The Northern Forum (www.northernforum.org) is a non profit organization comprising of regional or sub national governments from eight northern countries: Canada, China, Finland, Iceland, Japan, Korea, Russian Federation, USA. The Forum's Board of Governors consists of senior regional governmental executives such as Premiers, Presidents, Heads of Administration and Governors. The Secretariat is based in Anchorage Alaska, USA. The Northern Forum has fostered communication and cooperation among northern regions providing avenues for discussion training and cooperative ventures. The forum has sponsored scientific, cultural and other workshops, symposiums and conferences to address common issues of the North. The Northern Forum manages a diversity of projects designed to protect the environment, tackle common social and cultural issues and improve life in the North. Human health projects focus on promoting healthy lifestyles and using technology to improve health care. Specific projects include an expansion of telemedicine in remote regions of Russia; mitigating substance abuse through training of professionals in improved treatment protocols; promoting infectious disease monitoring; and promoting healthy lifestyles in the north.

Human health and the Arctic Council

The Arctic Council (www.arctic-council.org), established in 1996, is a Ministerial intergovernmental forum promoting cooperation, coordination and interaction between eight Arctic States, (USA, Canada, Denmark/Greenland, Iceland, Norway, Sweden, Finland and the Russian Federation) including Arctic indigenous communities and other Arctic residents, on common concerns such as sustainable development and environmental protection in the Arctic. The scientific work of the Arctic Council is carried out in 6 working groups. The Arctic Council Action Plan (ACAP), the Arctic Monitoring and Assessment Program (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Protection of the Marine Environment (PAME), Emergency Preparedness and Response (EPPR), and Sustainable Development and Utilization (SDWG) (**Fig. 1**). The working groups conduct research and other activities in the areas of monitoring, assessing and preventing pollution in the Arctic, climate change, biodiversity conservation, emergency preparedness and response, sustainable development and use, and the monitoring and assessment of living conditions of Arctic residents including human health. The human health activities of the Arctic Council primarily reside in the AMAP and SDWG.

Arctic Monitoring and Assessment Program

Initially established in 1991 as part of the Arctic Environmental Protection Strategy (AEPS), the Arctic Monitoring and Assessment Program is a working group within the Arctic Council with a mandate to conduct assessments of levels, trends and effects of contaminants on ecosystems and humans, including effects of oil and gas activities. (www.amap.no). A special priority has been placed on the potential impacts of contaminants on the health of Arctic residents. The human health activities of the AMAP are coordinated by a subsidiary group of the Arctic Council, the AMAP Human Health Assessment Group (HHAG). Members are senior scientists conducting research in the area of anthropogenic contaminants and human health from all eight Arctic countries. The main objectives of the AMAP HHAG are to continue co-operation on health issues including assessing the relationships between pollution and health. To date AMAP has completed and published three Human Health Assessments (7, 8, 9) and was a major contributor to the Arctic Climate Impact Assessment (ACIA), which included a chapter on the impact of climate change on human health in the Arctic (10).

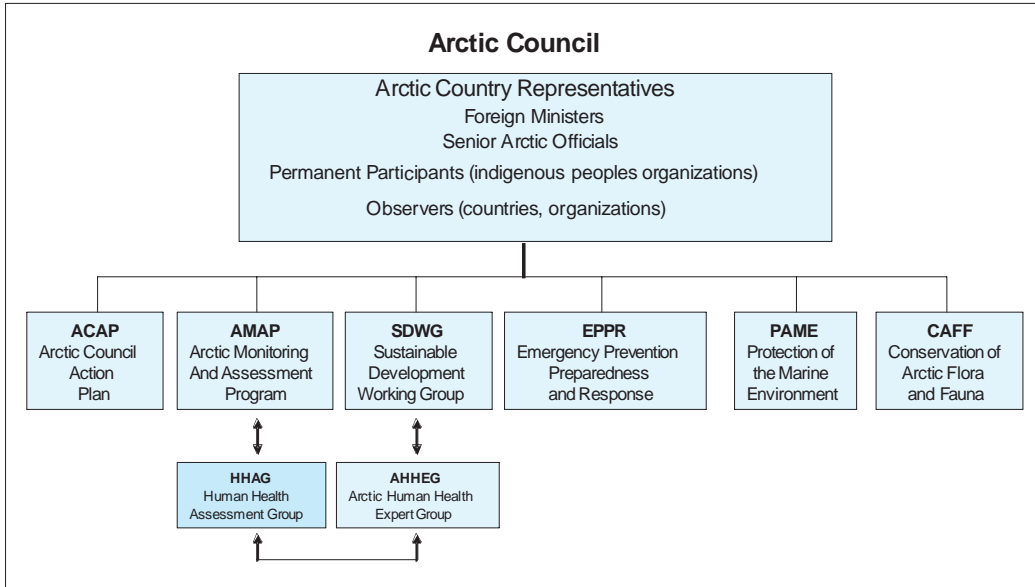


Figure I. Arctic Council organizational structure.

How the Arctic Council works.

Decisions within the Arctic Council are taken at meetings of Foreign Ministers of member states (or their designees) and the political leaders of Permanent Participants. Ministerial meetings are held every two years. The chairmanship of the Council and accompanying Secretariat rotates among member states (currently Greenland/Denmark). Between ministerial meetings, the operation of the Council is administered by the Committee of Senior Arctic Officials, comprised of representatives of foreign ministries' of the member states and representatives of the indigenous peoples as Permanent Participants' of the Arctic Council. The scientific work of the Arctic Council is carried out in six working groups. The working groups are focused on sustainable development, monitoring, assessing and preventing pollution in the Arctic, climate change, biodiversity conservation, and sustainable use, emergency preparedness and prevention in addition to the living conditions of Arctic residents. Working groups may create subsidiary bodies comprised of subject matter experts to coordinate and carry out programs and projects under the guidance and direction of a particular working group. Two such groups now include the AMAP Human Health Assessment Group and the SDWG Arctic Human Health Expert Group. The Expert Groups have the independent responsibility for the generation, and content of scientific assessments, recommendations and summary reports. These are in turn presented to the working groups who are responsible for presentation of scientifically based policy-relevant recommendations to the ministers for their consideration and recommendations for action.

Sustainable Development and Utilization Working Group

The mandate of the Arctic Council's Sustainable Development Working Group (SDWG) is to advance sustainable development in the Arctic. This includes opportunities to protect and enhance the environment and the economies, culture and health of the indigenous communities and other inhabitants of the Arctic, and to improve the environmental, economic and social conditions of Arctic communities as a whole.

Since 1998 the SDWG has undertaken several activities intended to improve the health of Arctic residents. These have included:

- 1) The Survey of Living Conditions in the Arctic (SliCA). This is an ongoing project, initiated in 1998 and led by Greenland and Denmark. It is an interdisciplinary and international research project designed to develop a new research design for measurement of living conditions and individual well-being among the Inuit and Sami peoples in the Arctic with an emphasis on the well-fare priorities of the indigenous peoples. (www.arcticlivingconditions.org).
- 2) Future of Children and Youth of the Arctic. This project focused on improving the understanding of the unique health challenges facing the children and youth of the Arctic. Another objective was to provide a benchmark for analyzing their health and well-being and to put forward recommendations to address their specific health needs. The analysis of this Canadian led initiative was reported in 2005 (<http://portal.sdwg.org/content.php?doc=23&xwm=true>). The report notes that even though significant improvements have been made in the health of children and youth in many regions of the Arctic, disparities in the health status between Arctic Indigenous and national populations remain. Policies to address these disparities will require standardized data that are comparable across nations, Arctic regions and indigenous groups.
- 3) Telemedicine in the Arctic. This US led project, was designed to share information among the Arctic Council's eight nations and six Permanent Participants about programmatic successes and lessons that have been learned from national and international experiences in remote health care delivery, training and education (<http://portal.sdwg.org/content.php?doc=23&xwm=true>). A result of this initiative has been a project sponsored by the Northern Forum, the regional Governments of Alaska (USA), Khanty-Mansiysk and the Sakha Republic (Russia) who are working together to expand the use of telemedicine technology in rural Russia.
- 4) The International Circumpolar Surveillance of Emerging Infectious Diseases (ICS). Established in 1999, and led by the US, this project has established an integrated International Circumpolar Surveillance system for infectious diseases by creating a network of hospital and public health laboratories throughout the Arctic. The network allows collection and sharing of uniform laboratory and epidemiologic data between Arctic countries to facilitate the tracking of selected infectious diseases of concern to Arctic residents and the formulation and implementation of prevention and control strategies (11, 12, 13).

In 2004 the Arctic Human Development Report was published by the Arctic Council (14). This report provides a comprehensive assessment of human conditions in the circumpolar region, and describes a framework and priorities for the SDWG. In the area of human health authors outline three major trends in health and well-being in the Arctic that could benefit from increased attention (5). The first trend is the increasing problem with mental health and violence in many Arctic communities. The report suggests that by using new approaches that engage the local community suicide rates may be reduced. The second trend is the increasing importance of community based participatory health research, which may benefit research in the area of nutrition and traditional foods. The third trend is the increasing use of new technology, and how this can be utilized to address health concerns and service delivery in remote and rural regions throughout the Arctic.

The Arctic Human Health Initiative

The Arctic Council recognized that the International Polar Year (IPY) 2007-2008, represented a unique opportunity to further stimulate cooperation and coordination on Arctic research and increase the awareness and visibility of Arctic regions, and an opportunity to expand cooperation on human health. In response the SDWG submitted the Arctic Human Health Initiative (AHHI) to the IPY International Program Office as an IPY coordinating project (IPY #167) that would advance the joint circumpolar human health research agendas of the Arctic Council working groups and the IUCH. AHHI was one of five Arctic human health related, endorsed full proposals submitted to the IPY International Program Office (**Fig. 2**).

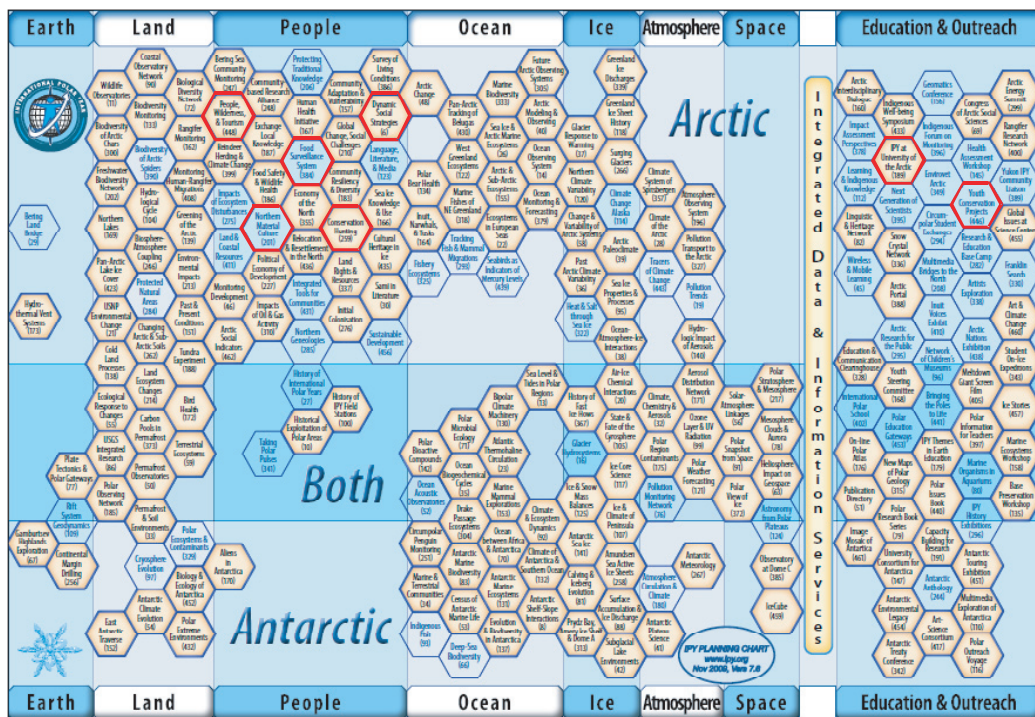


Figure 2. The IPY Honeycomb chart showing human health related endorsed projects (outlined in red). The chart maps endorsed full proposal according to their approximate subject (horizontal) and geographic region (vertical). Each Full Proposal was reviewed by an expert panel of scientists or outreach and education professionals. As of January 2007, 228 full proposals out of 407 submitted have been fully endorsed by IPY. The number in each hexagon refers to the proposal ID number in the Full Proposal data set found at <http://classic.ipy.org/development/eoi/>

The AHHI was designated an IPY coordinating project under which other projects could be grouped and monitored. In this way AHHI could link researchers with potential international collaborators and to serve as a focal point for human health research, education, outreach, and communication activities during IPY (2007-2008). The overall goal of the AHHI is to increase awareness and visibility of human health concerns of Arctic peoples, foster human health research, and promotes health strategies that will improve health and well being of all Arctic residents. Proposed activities included:

- Expanding research networks that will enhance surveillance and monitoring of health issues of concern to Arctic peoples, and increase collaboration and coordination of human health research
- Fostering research that will examine the health impact of anthropogenic pollution, rapid modernization and economic development, climate variability, infectious and chronic diseases, intentional and unintentional injuries
- Promoting education outreach and communication that will focus public and political attention on Arctic health issues, using a variety of publications, printed and electronic reports from scientific conferences, symposia, and workshops targeting researchers, students, communities, and policy makers
- Promoting the translation of research into health policy, community action including implementation of prevention strategies and health promotion
- Promoting synergy and strategic direction of Arctic human health research and health promotion

AHHI project priorities and project criteria were developed through meetings of an AHHI International Advisory Committee which met in Copenhagen Denmark April 7th, 2005 and in Quebec City, Quebec, Canada October 25th 2005. In addition, the 13th triennial ICCH (June 12-15, 2006 in Novosibirsk, Russian Federation) served as the “Gateway to IPY” for the circumpolar health community. This congress brought together circumpolar health care professionals, workers, researchers, policy makers and indigenous community members. The meeting presented a forum for discussion on their respective visions and priorities for human health activities for the IPY and beyond. These discussions resulted in recommendations that emphasized the role of communities in research planning, research activities and the translation of research findings into actions that would benefit the health and wellbeing of Arctic communities. Criteria for human health proposals were developed. An IPY AHHI project must include an international partnership of at least one other collaborator in a circumpolar country. Research projects could build on existing Arctic Council human health projects or focus on new priority areas including studies that would increase the understanding, or reduce the human health impact of anthropogenic pollution, contaminants and zoonotic infectious diseases and their impact on the traditional food supply, climate variability, oil and gas

development, infectious diseases, chronic diseases, unintentional injury and suicide. Projects could propose to expand existing (or suggest new) human health surveillance, monitoring and research networks. AHHI would encourage research projects that use surveys to characterize health status, assess health risks, and determine culturally appropriate interventions. An important component of IPY was education outreach and communication. Therefore it was important to solicit proposals that would focus public and political attention on Arctic health issues, that would increase dialog between researchers policy makers and communities, increase distribution of scientific information to scientists through conferences, symposia, workshops, electronic and printed media, increase community involvement in research activities and foster a new generation of Arctic health scientists.

Using these criteria scientists interested in Arctic human health and IPY research were encouraged to submit Expressions of Interest (EoI), or Full Proposals (FP) using the IPY proposal submission process. www.ipy.org

As of March 31, 2009, 21 EoI's , and 10 FP's were submitted as proposals under the AHHI. These are listed in **Table I**, and are summarized below. Further detail can be found at www.ipy.org searching the project data base using the EoI or FP number. In addition, there are 4 "National Initiatives" submitted to the AHHI as IPY human health proposals but were not registered with the IPY International Program Office. These are also summarized below, and further details can be found at the AHHI website www.arctichealth.org. The distribution of proposals submitted by country is shown in **Fig. 3**.

During the IPY the AHHI was coordinated by an international steering committee with representation of scientists from IUCH human health working groups, and permanent participants of the Arctic Council. The role of the steering committee is to provide the general oversight, coordination and communication of IPY AHHI projects and activities during the IPY. A secretariat was established at the University of Alaska Anchorage, and maintains the AHHI website at www.arctichealth.org. This is a central repository for all AHHI activities. AHHI has been funded in part by the CDC's Arctic Investigations Program, the U.S. Department of State's Bureau of Oceans, and International Environmental and Scientific Affairs, and the University of Alaska.

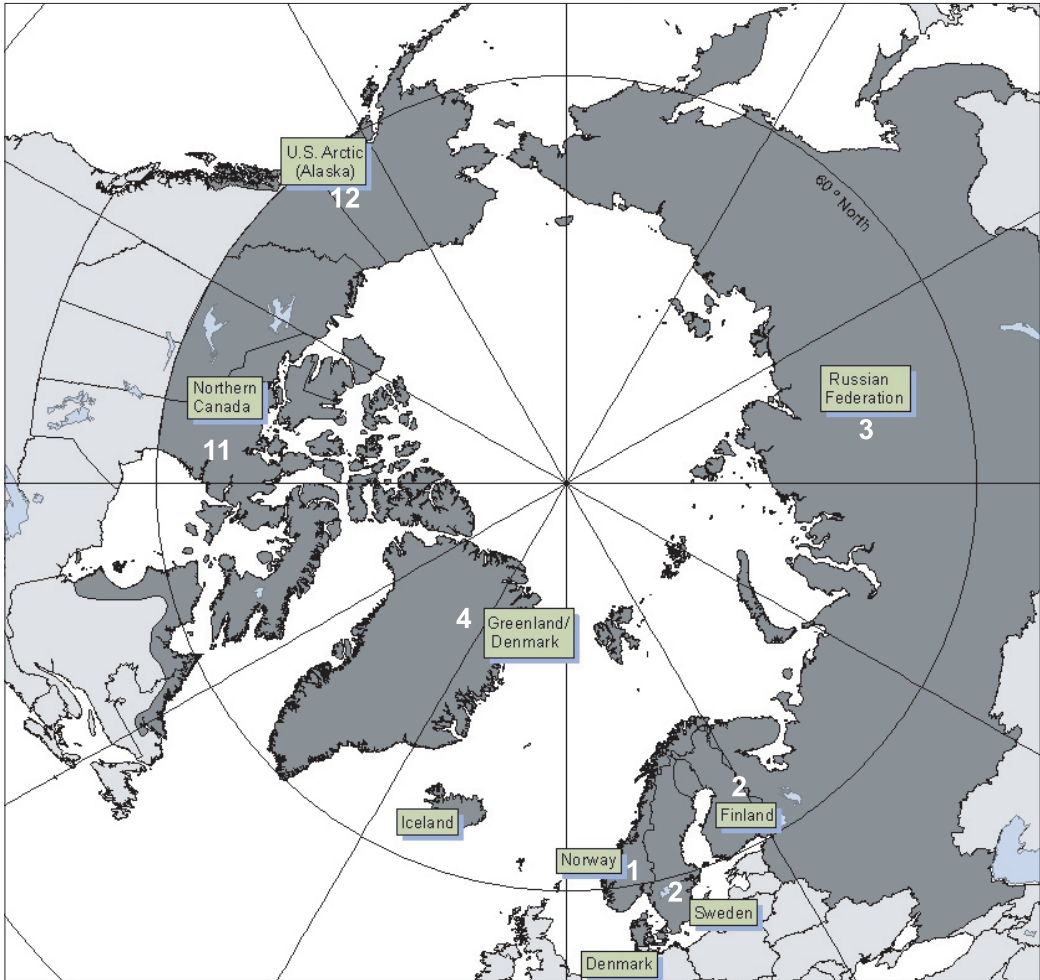


Figure 3. The number of IPY human health project proposals submitted by each country.

Table I. Arctic Human Health Initiative proposals submitted as of March 31, 2009.

Project Title	Lead Country(s)	Eo/FP#
Expansion of Networks		
International Circumpolar Surveillance	USA	1150
Arctic Monitoring and Assessment Program	Canada	145
International Network for Circumpolar Health Researchers	Canada	516
Arctic Health Research Network	Canada	449
Survey of Living Conditions in the Arctic: remote access	Denmark	190
Research		
Arctic Resiliency and Diversity: Community response to change	Canada	183
A circumpolar study of new contaminants in women of reproductive age; an assessment in human blood, dietary sources and possible associations to pregnancy outcome	Norway	356
Change in Diet and Lifestyle and Rise in Chronic Diseases of Alaska Native People- the EARTH Study- Education and Research Towards Health	USA	271
The Inuit Diet and Health Study: Inuit Health in Transition	Canada	253
Genetics and Environmental Risk Factors for Complex Diseases: A study of the Saami population	Sweden	1274
Center for Alaska Native Health Research	USA	NI
Research & Action Plan for Human Health Risk Reduction in the Arctic (Human Health Risk Reduction in the Arctic)	Russia	1113
Public Health in Russian Arctic: Analytic Review for Russian Program of International Polar Year 2007-2008 (RAHR-Russian Arctic Health Review).	Russia	1139
The Siberian Birth Outcomes Study (SIBOS)	Russia	1122
Does Exposure to Persistent Organic Pollutants (POPs) increase the risk of breast cancer?	Denmark	1257

Table I continues on next page

Table I continues from previous page

Project Title	Lead Country(s)	EoI/FP#
An Epidemiological Study of the Cumulative Health Effects of Persistent Organic Pollutants and Mercury in Subsistence Dependent Rural Alaska Natives.	USA	NI
Arctic Community-Based Environmental Monitoring, Observation and Information Stations Phase I: Bering Sea Sub-Network	USA	247
Integration and health - a comparative study of how socio-demographic changes have influenced the health condition of the Sami and the Inuit since the 18th century	Sweden	1184
The burden of Infectious Diseases in Greenland-means of evaluation and reduction	Denmark	1107
Hepatitis B in aboriginal Populations in the Arctic:Alaska Natives, Canadian Inuit, First Nations Peoples, Greenland Inuit and Russian Native Populations.	USA	1109
Sexual Health and Sexually Transmitted Infections in Northern Frontier Populations.	Canada	1147
Engaging Communities in the Monitoring of Zoonoses, Country Food Safety and Wildlife Health	Canada	186
Evaluation of the impact of an immunization program combining pneumococcal conjugated vaccine and inactivated influenza vaccine in Nunavik children, Province of Quebec, Canada	Canada	1119
Prevalence of Human Papillomavirus Infection and Cervical Dysplasia in the North West Territories	Canada	1121
Haplotype diversity in candidate genes for susceptibility/resistance to infectious disease among circumpolar Aboriginal populations	Canada	1185
Health and social condition of adoptees in Greenland - a comparative register and population based field study. Creation of an "adoptees-database"	Denmark	1201
Health Lifestyle Projects	USA	1271

Table I continues on next page

Table I continues from previous page

Project Title	Lead Country(s)	EoI/FP#
Negotiating Pathways to Adulthood: Social Change and Indigenous Culture in Four Circumpolar Communities	USA	1266
Mental and Behavioral Health Issues in the U.S.Arctic	USA	NI
Outreach Education Communication:		
The Circumpolar Health and Wellbeing: Research program for Circumpolar Health and Wellbeing, Graduate School of Circumpolar Wellbeing, Health and Adaptation, and International Joint Master's Program in Circumpolar Health and Wellbeing	Finland	1045
Scientific and professional supplements on human health in polar regions the International Journal of Circumpolar Health	Finland	1046
Pressures and Impacts on the Health and Well-being of Indigenous People of the Arctic: Invitational International Symposium and Symposium Publication	Canada	433
Development of a Women's Health and Well-Being Track at the 14th International Congress on Circumpolar Health in Yellowknife, NWT July 2009	USA	1223
Telemedicine Cooperation Project	USA	1270
Climate Change and Impacts on Human Health in the Arctic: An International Workshop on Emerging Threats and Response of Arctic Communities to Climate Change	USA	NI

EoI= Expression of Interest; FP= Full Proposal (in bold); NI= National Initiative

IPY HUMAN HEALTH PROPOSALS

Expansion of networks

The establishment of well coordinated and Sustained Arctic Observing Networks (SAON) is a major objective of the IPY (www.arcticobserving.org). The goal is to develop long term Arctic wide observing activities that provide free, open and timely access to high quality data for both the scientific and societal communities. In 2006 the Arctic Council Ministers requested that the AMAP together with other Arctic Council working groups and external partners create a coordinated Arctic Observing System to monitor Arctic Change (*Salekhard Declaration 2006*)(2). One of the priorities of the SAON process is to identify existing observing networks and opportunities for improving access and data sharing.

Several circumpolar human health monitoring networks already exist and could form the basis for the establishment of a SAON for human health which could provide: 1) an international circumpolar collaborative health information system, 2) systematic standardized, consistent methods in data collection, analysis, and reporting, 3) ability to monitor trends and patterns in health status, health determinants and health care, 4) quantitative evidence for planning and evaluation of health programs and services, 5) a system that is population based and aggregated by administrative regions in all circumpolar countries.

Existing networks that could provide the basis for such an observing system include:

1. International Circumpolar Surveillance

The purpose of the International Circumpolar Surveillance (ICS) system for infectious diseases is to establish a surveillance network of hospital and public health laboratories throughout the Arctic. The network allows the collection and sharing of uniform laboratory and epidemiologic data between Arctic countries that defines the prevalence of infectious diseases of concern to Arctic residents and assists in the formulation of prevention and control strategies. Currently the system monitors invasive bacterial diseases and tuberculosis in the US Arctic (Alaska), northern Canada, Greenland, Iceland Norway, Finland, northern Sweden. Expansion of ICS to include northern regions of the Russian Federation is anticipated in 2009 (**Fig. 4**). While currently focused on prevention and control of infectious disease the system could be adapted to monitor other human health issues of concern in Arctic countries, and serves as a model for a Sustainable Arctic Observing Network (SAON) for human health.

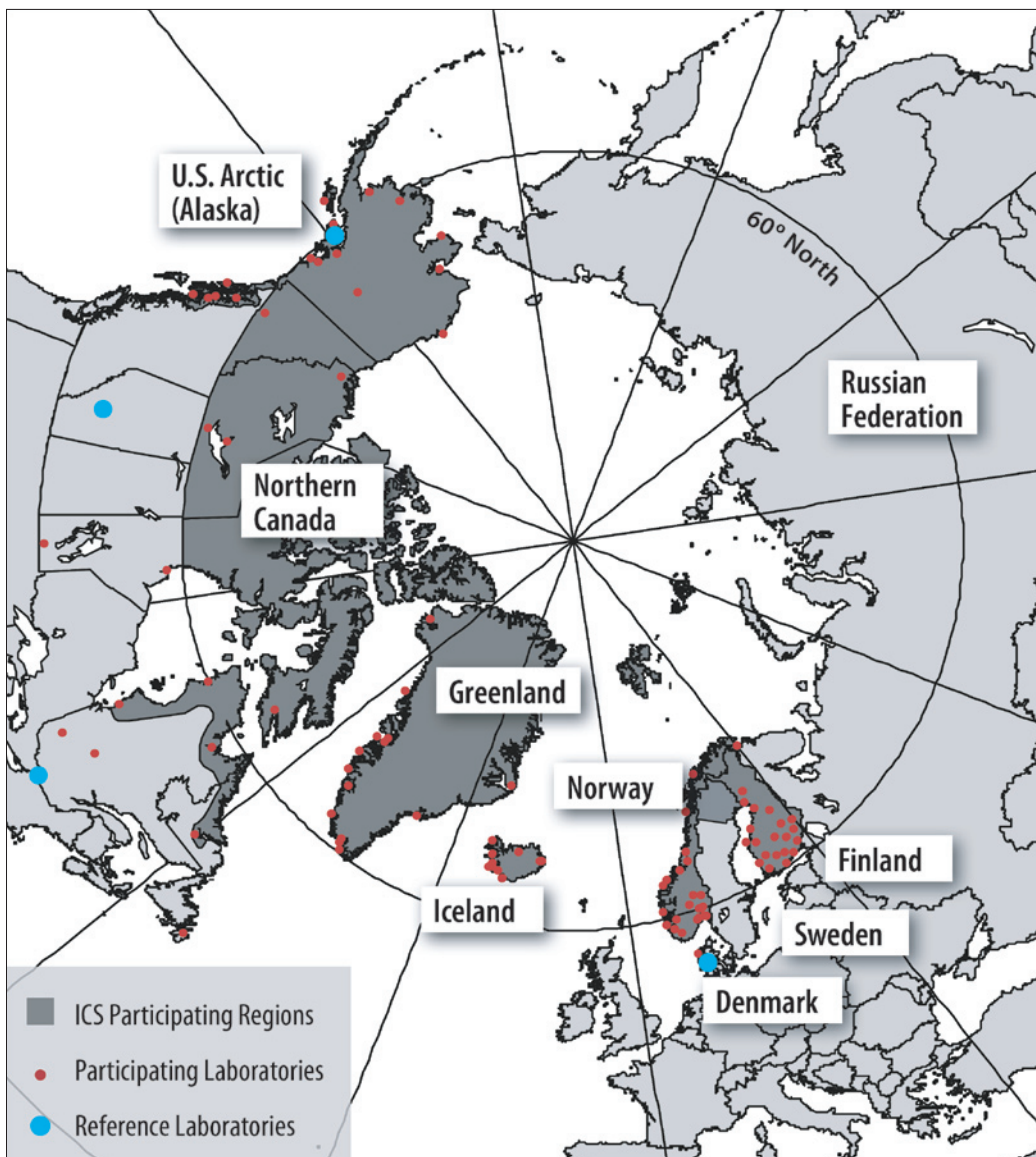


Figure 4. International Circumpolar Surveillance. The figure shows countries currently participating in the ICS and surveillance of invasive bacterial diseases. During the IPY the surveillance of tuberculosis was initiated with participation of northern regions of the Russian Federation.

2. Arctic Monitoring and Assessment Program: Human Health Assessment Group

The Arctic Monitoring and Assessment Program (AMAP) has been coordinating circumpolar monitoring and assessment of atmospheric pathways, biota impacts, food chain dynamics and human health issues for environmental contaminants since 1991 (<http://www.amap.no/>). The contaminants have included persistent organic pollutants (POP's, both historic and emerging compounds), metals and radionuclides of concern in the circumpolar world. The AMAP Human Health Assessment Group (HHAG) has members in all eight circumpolar countries and has completed three assessments on the human health impacts of arctic environmental contaminants (7, 8, 9). These assessments include human monitoring data, dietary studies, health effects studies and risk management strategies to mitigate the effects of contaminants. The HHAG has effectively functioned as an Arctic Observing Network for environmental contaminants in the circumpolar north and could work with the other human health observation networks to give an integrated picture of circumpolar human health.

3. International Network for Circumpolar Health Research

The goals of INCHR are: 1) conduct, sponsor, and promote research programs and projects investigating the patterns, determinants and impact of health conditions among circumpolar peoples and the strategies for improving their health; 2) support research training at all levels and increase capacity for circumpolar health research in communities, service delivery agencies and higher educational institutions; 3) facilitate exchange, communication and dissemination of research data; 4) strengthen the health information system in the circumpolar region. (www.inchr.com)

4. Arctic Health Research Network

The Arctic Health Research Network is a health research network based in the three northern territories and a provincial region of Canada. The network has four sites in Yukon, Northwest Territories, Nunavut and Labrador. Each is registered under the Territorial Societies Act and is governed by a board of directors. The network's vision is to build on the strengths and knowledge of all cultures to achieve health in the territory.

The network fosters partnerships for the development of northern health knowledge through research, facilitation and training. The AHRN supports activities which build sustainable health research infrastructure in the north as well as engage northern partners in health research projects. The network is engaged in a broad spectrum of research projects and activities including community based participatory projects around climate change, suicide prevention and food security, territory wide research projects including HPV prevalence, surveillance development, knowledge translation, enhancing research capacity in territorial organizations through research methods workshops, proposal writing workshops and services as well as the training and support of graduate students. Specific activities and events for each region can be found at the website. www.arctichealth.ca

5. Survey of Living Conditions in the Arctic-remote access

Initiated in 1998, the first phase of this project developed a standardized research design for the measurement of living conditions and well-being among the Inuit, Saami, and indigenous peoples of Chukotka. The survey was completed in 2006. During the IPY SLiCA will expand the understanding of Arctic change by extending the concepts of remote access analysis to the SLiCA international data base, allowing other researchers to remotely conduct analysis without access to raw data. www.arcticlivingconditions.org

There are several other human health and social indicator networks that are operational and will increase our research capacity and address social realities of the Arctic. They all aim to encourage data sharing and use.

The Arctic Social Indicators (ASI) is a follow-up project to the Arctic Human Development Report (14). This project, which is currently on-going, will take advantage of existing data to create relevant indicators, and will recommend a set of new and relevant indicators. ASI will develop indicators in six domains: ability to guide one's destiny, cultural integrity, contact with nature, education, health and demography, and material well-being. The Arctic Observation Network Social Indicators Project (AON-SIP) is compiling data using a common framework, geography, time, and variables. There are five clusters of indicators: community living conditions (organized within the six ASI domains), tourism, fisheries, oil gas and mining, and marine transportation, and marine mammal hunting (www.search-hd.net). ArcticStat is a portal database that allows the user to select and reach existing tables that cover Arctic countries and regions, some ten socio-economic indicators and more sub-indicators, and provided separately for each year (www.arcticstat.org). Thousands of tables mainly from national agencies are linked to ArcticStat. All of the above projects are attempting to integrate their data.

Significant difficulties are presented in the use of existing data due to a lack of uniformity between existing data sets (between two countries for instance) and barriers to access the data (tables not accessible at the regional level, or in English language, or involves excessive charges). Moreover, no researchers/agencies have ongoing funding for these important determinants and in some countries there is no funding for even basic database operation.

Research proposals

Research is needed to address human health concerns and challenges that face Arctic peoples. These concerns include: the health impacts of environmental contaminants, climate change, rapidly changing social and economic parameters within communities, the changing patterns of chronic diseases, the high rates of injuries that occur in Arctic regions and the continuing health disparities that exist between indigenous and non indigenous segments of the Arctic populations. Research proposals submitted:

1. **Arctic resiliency and diversity: community response to change**

This integrated program is framed by Arctic peoples' resiliency, where partnerships are fostered which highlights the strength and aspiration of Arctic residents. Several themes will be explored. These include self-determination, governance, economic change and community dynamics. Specific health concerns will be addressed including diabetes, heart disease, HIV, cancer, mental health and injuries. In addition, factors that contribute to health including genuine progress indicators, water, environmental health, ownership of health, addictions, lifestyle, technology impacts and cumulative effects will be explored.

The second theme will cover Northern Health Indicators, which addresses issues such as unintentional/intentional injuries, mental health lifestyle (addictions), and genuine progress indicators.

An overarching community driven, Arctic lead, health and wellness research network is proposed that facilitates and participates in health research activities during the IPY within a model in which the resiliency and diversity of Arctic peoples is highlighted to answer questions that will create healthy environments and improve the health of persons in the circumpolar Arctic.

2. **A circumpolar study of new contaminants in women of reproductive age: an assessment in human blood, dietary sources and possible associations to pregnancy outcome**

In a recent Norwegian-Russian study, new contaminants, like brominated flame retardants and perfluorinated alkylated substances (PFAS) were detected in blood of pregnant women from northern Norway and Russia. This pilot study confirmed that new contaminants are transported to the Arctic and accumulate in the human body. Several physical and biological conditions in the Arctic have resulted in very high levels of some classical Persistent Organic Pollutants (POPs) in marine food chains. Indigenous people have thus become a vulnerable group due to the high levels of POPs in their traditional food. For the emerging contaminants it is important to establish potential sources and routes of exposure in order to ensure that regulations are implemented before levels become too

high. To accomplish this it is important to have good data on human and food source distribution of these compounds.

This proposal plans to adapt an established project protocol to each of the participating countries including a questionnaire on life style, medical history and dietary habits; medical records of pregnancy outcome; and perform selected analyses of “new” contaminants in blood.

3. Change in diet and lifestyle and rise in chronic diseases of Alaska Native people- the EARTH Study- Education and Research Towards Health

The goal of this project is to identify aspects of traditional and subsistence lifestyle and diet that contribute to health. This project is designed to be a long term prospective study. Adult volunteers consent to participate. During the pilot phase, its target recruitment is at least 5,000 Alaska Natives residing in Alaska in small rural communities as well as urban cities. The enrollment process consists of an interview during which participants complete questionnaires on diet and lifestyle, have anthropometric measurements recorded, and undergo a fasting lipid profile and blood sugar evaluation. The study evaluates diet and physical activity, but also includes other relevant questions known to have an effect on chronic disease including tobacco use, living conditions, and social and cultural factors. Participants also answer questions about their personal and family medical history, and consent to review of their computerized medical record and medical charts. Data from this study could be compared to those being conducted among other circumpolar indigenous populations.

4. The Inuit diet and health study/Inuit Health in Transition

This survey on social and cultural factors in a large cohort of Inuit in Alaska, Canada, and Greenland focuses on diet and other lifestyle factors known effect chronic disease status, such as smoking, contaminant exposure, and physical exercise. This large project will give a cross-sectional description of the associations between environment, living conditions, lifestyle risk factors and existing disease status among these populations. (www.arcticnet.ulaval.ca).

5. Genetics and environmental risk factors for complex diseases: a study of the Saami population

This study evaluates a northern Swedish population with known demographic and environmental exposures to identify genetic and environmental factors that contribute to health status. Cross-population comparisons are used to study genetic and environmental risk factors among populations with widely differing origins and environments.

6. Center for Alaska Native Health Research

The Center for Alaska Native Health Research (CANHR) was established in 2001 at the University of Alaska Fairbanks (<http://canhr.uaf.edu/>). CANHR's overall goal is to achieve a permanent and sustainable research center at the University of Alaska Fairbanks with the primary theme of investigating obesity and chronic disease-related risk and protective factors. CANHR is developing unique biomedical knowledge and translating it into research for the prevention and reduction of health disparities among Alaska Natives. The objectives of the Center are to build a collaborative research presence in Alaska Native communities focusing on prevention and reduction of health disparities, cultural processes awareness and community-based participatory research methods.

7. Research & action plan for human health risk reduction in the Arctic (Human Health Risk Reduction in the Arctic)

Although the latitude-dependent increase of POP levels in the Arctic regions are confirmed by many international studies, the ecotoxicologic consequences still remain largely unknown. The high levels of contaminants in the Arctic have already raised serious concerns about the health of indigenous populations. The harsh Arctic climate, in particular the cold, is capable of modifying the health effect induced by some inorganic toxicants, vibration and physical strain. Little is known about the interaction between cold stress and human exposure to particular contaminants. The main objective is to elaborate a scientifically sound, economically feasible and ethically acceptable action plan to reduce health risks associated with combined exposures of persistent contaminants and environmental stressors including geophysical and climatic factors with special emphasis to indigenous people.

8. Public health in Russian Arctic: analytic review for Russian program of International Polar Year 200702008 (RAHR-Russian Arctic Health Review).

The goal of this project is to assess the main processes which determine the conditions of life and health of people living in high latitude territories of the Russian Federation, and to compare the main health indicators of indigenous, non indigenous and non Russian Arctic populations of Europe, Canada and USA.

9. The Siberian Birth Outcomes Study (SIBOS)

The objectives of this study are to: (1) create a database of births in Siberia which will allow epidemiological study of a variety of pregnancy outcomes in relation to month

and season of birth, latitude and climate/climate change, known areas and risks for environmental toxins and other potential reproductive hazards, duration of exposure to potential demographic risks, ethnicity (including aboriginal peoples), and exposure to known reproductive toxins such as alcohol and tobacco; (2) to determine Siberia-specific risk factors for adverse pregnancy outcomes; (3) to evaluate the impact of early exposure (at the time of conception and birth) on subsequent health indices and (4) to compare the Siberian data with those of Norway and North Canada.

10. Does exposure to persistent organic pollutants (POPs) increase the risk of breast cancer?

Few studies of breast cancer and POPs exposure have been conducted in Arctic populations. The aim of this project is to undertake an epidemiological investigation of the risk of breast cancer in relation to exposure to POPs among Greenlandic women. The study will collect data on diet, fatty acid biomarkers, trace elements, genotyping and xenobiotic serum activities.

11. An epidemiological study of the cumulative health effects of persistent organic pollutants and mercury in subsistence dependent rural Alaska Natives

This study will examine POP's and mercury levels in salmon, and marine mammal tissue, and the blood of resident mothers and infants from western Alaska to determine if climate change is increasing the levels of these contaminants in the environment. If climate change is associated with rising levels of POP's and mercury in salmon and human it would provide data to further support reduction of the production and release of these compounds, and efforts to reduce global warming.

12. Arctic community-based environmental monitoring, observation and information stations phase 1: Bering Sea sub-network

The goal of this project is to increase scientific knowledge that has significance for understanding of pan-Arctic processes and enhance the ability of scientists, Arctic communities and governments to predict, plan and respond to environmental change. Six indigenous communities in Alaska and north eastern Russia will gather environmental observations on the primary subsistence and commercial fish and marine mammal species of the Bering Sea. Information will be gathered on changes in climate and environmental conditions, the abundance and quality of the resource, change in migration patterns and habitat, the effect of changes on the availability of the resource, food supply and health and livelihood of the community (www.bssn.net).

13. Integration and health - a comparative study of how socio-demographic changes have influenced the health condition of the Sami and the Inuit since the 18th century

The main objective of the project is to study the health trends in different Sami and Inuit populations and relate them to socio-demographic changes, and to develop a theoretical framework on the relations between the health condition of minority populations in the arctic region and the processes of assimilation, integration and segregation of these populations. The theoretical framework on how socio-cultural processes are related to health is incomplete. Compared with the Sami, the health and life conditions of the Inuit of Greenland and Denmark are relatively well studied, with data from extensive epidemiological studies based on clinical examinations, self-reported health, identity and lifestyle, allowing detailed knowledge on the epidemiological transition that has occurred among the Inuit. The long history of collecting and maintaining national statistics in Sweden makes it possible to gain new information on the socio-demographical and health development of the Sami.

14. The burden of infectious diseases in Greenland-means of evaluation and reduction

This project will address the burden of infectious diseases in Greenland by establishing research programs to evaluate long-term consequences of certain infectious diseases, to evaluate the use of routine surveillance data, to initiate intervention trials in order to prevent infectious diseases, and to establish cooperation with organizations in other countries.

15. Hepatitis B in aboriginal populations in the Arctic: Alaska Natives, Canadian Inuit, First Nations Peoples, Greenland Inuit and Russian Native Populations

The goals of this project are to: determine the epidemiology of chronic HBV in Aboriginal populations, monitor patients to determine disease progression, examine demographic characteristics associated with disease outcome, examine environmental factors associated with disease outcome, including contaminants in the environment and subsistence foods, examine cofactors such as alcohol intake, obesity and metabolic syndrome, examine viral characteristics such as genotype, and viral loads and mutations that could affect disease outcome. This study will allow the identification of barriers to treatment, potential treatment candidates, monitoring of treatment outcome and the examination of the role of factors such as demographics, viral genotype, and environmental factors in treatment outcome.

16. Sexual health and sexually transmitted infections in northern frontier populations

The objective of this project is to build capacity to examine individual, social and environmental factors that influence perceptions of sexual health and sexually transmitted infections. The approach will be community based participatory research. The aims include a description of the basic epidemiology of STIs, pregnancy, and pregnancy outcomes, and to identify communities at risk and targets for capacity building and interventions

17. Engaging communities in the monitoring of zoonoses, country food safety and wildlife health

Food borne parasites such as *Trichinella*, *Toxoplasma* and *Anisakis* are significant Arctic zoonoses endemic in some regions and directly related to consumption of country food. The objectives of this proposal are to: 1) document the distribution and abundance of *Trichinella nativa*, *Toxoplasma gondii* and *Anisakis simplex* in Arctic/subarctic wildlife, 2) develop community based capacity for ongoing detection and monitoring of these pathogens and 3) facilitate the collection of wildlife samples from other researchers.

18. Evaluation of the impact of an immunization program combining pneumococcal conjugated vaccine and inactivated influenza vaccine in Nunavik children, Province of Quebec, Canada

In the Nunavik region in the province of Quebec, hospitalizations for pneumonia are much more frequent than in the general population of Quebec and it is estimated that a quarter of children present with hearing deficit by the age of 5 years. In the spring of 2002, a routine infant immunization program with the 7-valent pneumococcal conjugate vaccine (PCV-7) was implemented along with a catch-up for children younger than 5 years of age. In the fall of 2003, the trivalent inactivated influenza vaccine (TIV-3) was offered to all 6 to 23 months old children. The objective of the study is to evaluate the impact of this double immunization program in young Inuit children, and to study for the first time the ability of the PCV-7 combined with the TIV-3 to prevent respiratory infections and audiological sequelae due to otitis media.

19. Prevalence of human Papillomavirus infection and Cervical Dysplasia in the North West Territories

In Canada, the high incidence and mortality rate of cervical cancer in Aboriginal populations of the Northwest Territories (NWT) has led to concerns about current screening methods. Recent reports in the literature have indicated that the Pap test is a less than ideal tool for screening for cancer of the cervix and this has generated interest in the potential for incorporating Human Papillomavirus (HPV) DNA testing into the present screening program. There is currently not a lot of information on the prevalence of HPV infection in the NWT which has the greatest number of Aboriginal communities in Canada. The objectives of the study

are to: 1) determine the prevalence of type specific oncogenic HPV infection and cervical dysplasia (precursor lesion) in women of the NWT, 2) explore the association between type specific oncogenic HPV infection and cervical dysplasia in Northern Canada and its sub-populations, 3) identify the sub-types of HPV infection associated with cervical dysplasias in the sub-populations of the NWT, and 4) provide scientific evidence for policy makers and local public health workers in NWT to plan and implement more effective cancer control programs. Women over the age of 15 in the NWT who attend routine clinics for Pap smears will be invited to participate in this cross-sectional study.

20. Haplotype diversity in candidate genes for susceptibility/resistance to infectious disease among circumpolar Aboriginal populations

This project will employ a three-pronged approach to assess the contribution of 5 candidate genes (Chemokine receptor 5 (CCR5), Vitamin D receptor (VDR), Killer Immunoglobulin-like receptors (KIR) and the cytokines Tumor Necrosis Factor α (TNF- α) and Interferon gamma (IFN- γ) to the susceptibility/resistance of infectious pathogens in Native North American populations. The identification of gene variants associated with susceptibility to infectious disease among circumpolar Aboriginal groups can contribute to the development of effective treatments for indigenous arctic communities. The three approaches will employ tools from population genetics, direct association studies, and ancient DNA analyses. The genes were chosen because the literature strongly suggests that these genes play a significant role in the active and innate immune response and should be subject to selective forces (pathogens).

21. Health and social condition of adoptees in Greenland - a comparative register and population based field study. Creation of an “adoptees-database”

Greenland has a huge number of adoptees and the number of children placed in institution is large. The study will explore the impact of adoption and collective care on well being, family health and social conditions. Adoption is closely linked to social organization, identity, cultural openness and collective consciousness. This study will identify settings in which adoption is linked to child neglect and lack of care. The study will also explore parents' and care givers' control and coping strategies.

22. Healthy lifestyle projects

Human development of the Arctic and subarctic regions, such as Alaska, Russia, Canada and other northern nations, has resulted in significant changes in the health and well being of its indigenous peoples as well as “newcomers” to the north. Emerging health problems include suicide, an increase in the incidence of diseases such as diabetes and cancer, and substance abuse. The activities under this project will provide information exchange and training opportunities to advance care and treatment of Arctic residents with mental health issues.

23. Negotiating pathways to adulthood: social change and indigenous culture in four circumpolar communities

Contemporary dynamics of rapid social change have dramatically affected the political, cultural, and economic systems of circumpolar Indigenous people. The Pathways study is a comparative, collaborative, and participatory circumpolar research project. It aims to explore responses to rapid social transition through the life experiences of circumpolar youth. The proposed study will examine 80 youth life history narratives. These narratives will come from Alaska Inupiat, Alaska Yup'ik, Canadian Inuit, and Siberian Eveny communities. In addition, the research team is developing collaborations using additional funding sources to examine the narratives of an additional 40 youth from a Norwegian Sami and Greenlandic community. In this study, the team intends to identify shared and divergent stressors and patterns of resilience in the transition to adulthood across these different circumpolar settings.

24. Mental and behavioral health issues in the U.S. Arctic

This study will examine the science base, gaps in knowledge, and strategies for the prevention and treatment of mental and behavioral health problems faced by populations in Arctic regions, with a focus on Alaska. Specifically, the project will:

- Summarize the scope and nature of mental and behavioral health problems among residents of Arctic regions, with special emphasis on Alaska and Alaska Natives
- Assess the infrastructure for research into the mental and behavioral health issues in Alaska to determine if current mechanisms and resources are appropriate to facilitate progress in the field. This should include analysis of which federal agencies are funding research programs and the mechanisms used
- Describe factors that contribute to promoting resilience and recovery in Northern residents and provide recommendations for strategies that will increase resilience in the affected populations and reduce health disparities
- Describe and assess the infrastructure for prevention and treatment of mental and behavioral health in Alaska; including federal, state and community based programs. This should include examination of collaborative efforts and discussion of ways to improve coordination between the multiple public and private agencies involved in promoting improved mental and behavioral health
- Identify steps that could be taken in the short-, medium-, and long-term to improve the mental and behavioral health of northern US residents, including research needed to understand the impact of Arctic climates and rapid social change on mental and behavioral health, improvements in community infrastructure directly related to health, changes in prevention and treatment programs, and mechanisms to improve training for mental and behavioral health care services

Outreach, education, and communication proposals

An important aspect of the AHHI is promotion of education outreach and communication which will: focus public and political attention on Arctic Health issues; increase dialogue between researchers, policy makers and communities; increase distribution of scientific information to scientists and the public through conferences, symposia, workshops and a variety of electronic and printed media; increase community involvement in research activities and foster a “new” generation of arctic health scientists. Projects include:

1. Circumpolar Health and Wellbeing: research program for circumpolar health and wellbeing, Graduate School of Circumpolar Wellbeing, Health and Adaptation, and the international joint Master’s Program in Circumpolar Health and Wellbeing

The Research Program for Circumpolar Health and Wellbeing includes a curriculum that aims to improve sustainable development of health and wellbeing in the circumpolar regions. The priority research areas are 1) risks, stress and adaptation (performance, symptoms, diseases, injuries, and mortality), 2) health and health care (elderly, children, and rural population), and 3) humanistic approach to wellbeing (minority languages, minority identities, anthropology and history, societies). The Graduate School of Circumpolar Wellbeing, Health & Adaptation, aims to increase the number of high-quality researchers and experts who are familiar with the health and wellbeing problems related to circumpolar areas and can use a multidisciplinary approach to find new solutions to ensure our wellbeing in the future.

The two-year interdisciplinary Masters in Circumpolar Health & Wellbeing is an international program, and will consist of multiform studies leading to a master’s degree in the different participating universities.

2. Scientific and professional supplements on human health in polar regions-the International Journal of Circumpolar Health

The emphasis of the proposed activity is on dissemination of scientific and professional information, promoting communication, outreach, knowledge translation and education on circumpolar health. For this purpose the International Journal of Circumpolar Health will produce a separate series of Circumpolar Health Supplements to serve as a forum of topics of general interest and related to the IPY themes.

3. Pressures and impacts on the health and well-being of indigenous people of the Arctic: invitational international symposium and symposium publication

This project will draw together new and established scientists and policy makers in an international symposium at the end of the IPY. Invited speakers and paying participants will contribute to presentations, posters, and rich panel discussion on 8 selected health themes relevant to Indigenous People. The results of the symposium will be summarized in a comprehensive scientific report that addresses the cutting edge of known and predicted health implications of changing economic, social, physical, and environmental conditions in the Arctic.

4. Development of a women's health and well-being track at the 14th International Congress on Circumpolar Health in Yellowknife, NWT July 2009

The Women's Health Working Group (WHWG) of the IUCH was reactivated at the 13th International Congress of Circumpolar Health in Novosibirsk in June 2006. Participants initially identified at least four areas of mutual interest, including but not limited to 1) perinatal health systems and challenges, 2) infectious disease, particularly HPV and new vaccine; 3) interpersonal violence prevention and 4) health communication and health literacy. The membership confirmed interest in developing a women's health and well-being track at the 14th International Congress of Circumpolar Health held in Yellowknife, NWT in summer 2009.

5. Telemedicine cooperation project

The Northern Forum is cooperating with the Alaska Federal Health Care Access Network (AFHCAN) to implement a strategic and innovative solution to address health care needs of two regions in the Arctic. Together the NF and AFHCAN are facilitating cooperation in telemedicine technology expertise between Alaska, the Republic of Sakha and Khanty-Mansyisk region in Russia. The goal of the project is to promote the establishment of a mutually beneficial collaboration in telemedicine, telehealth, mobile medicine and distance learning in remote areas of the Russian north.

6. Climate change and impacts on human health in the Arctic: an international workshop on emerging threats and response of Arctic communities to climate change

The Arctic Climate Impact Assessment (ACIA) was published in 2005 and was the first comprehensive scientific assessment of climate change in the Arctic (Arctic Council 2005). The assessment also provides recommendations by which communities, researchers and policy makers can begin to address the challenges posed by climate change.

The impact of climate change on human health of Arctic residents will depend on many factors. Much research remains to be done on the relationship between climate change and individual and community health. Climate will continue to influence public health in small and remote communities of the Arctic. The recent record of warming, and potential continued warming of the Arctic, combined with the multiple mechanisms by which climate impacts health indicate an urgent need for adopting community based monitoring strategies that would identify both emerging threats and opportunities.

This project will support a workshop that will bring together researchers from circumpolar countries to: 1) update current knowledge on the impact of climate change on human health, 2) examine the principle conclusions and recommendations of the ACIA on human health to determine potential items for action 3) examine the feasibility of implementing community based monitoring strategy with and across regions to measure and report a common set of climate, health status, environmental, infrastructure and ecosystem indicators.

Developing synergy and strategic direction of human health research and health promotion in the Arctic

The expansion of, and interest in Arctic Council human health activities during the IPY underscored the need to develop a strategic direction, and a structure for prioritizing, approving and monitoring human health activities within the SDWG and to ensure coordination of projects with other working groups of the Arctic Council and other circumpolar organizations engaged in improving the health of Arctic peoples.

In order to manage this expanding role, the SDWG has formed the Arctic Human Health Expert Group (AHHEG), which will be a subsidiary body of the SDWG (**Fig. 1**), that will provide expertise on human health topics, coordinate human health activities between Arctic Council working groups and build linkages and partnerships with other circumpolar human health and indigenous peoples organizations. The AHHEG membership is comprised of subject matter experts appointed by SDWG member countries and permanent participants, with professional circumpolar expertise in the areas of health systems, services and policy, social cultural and economic aspects of health, indigenous and traditional knowledge, physical and social science including behavioural and mental health and human biology, and environmental health, contaminants, and climate change.

Specific responsibilities of the AHHEG include: assisting the Arctic Council in better coordinating its human health activities, by: identifying priority projects that will result in improved health, engaging the appropriate subject matter experts to collaborate on priority projects, monitor project progress, improving the Arctic Councils ability to translate knowledge gained into meaningful actions that will benefit communities, and that will result in health improvement.

Early priorities of the AHHEG have been identified and include a focus on:

- 1) Behavioural and mental health including youth suicides
- 2) Diet and nutrition with an emphasis on food security, safe water, obesity, diabetes and cardiovascular diseases
- 3) Health care in indigenous populations, and culturally appropriate health-care of the elderly
- 4) Inequalities in health
- 5) The human health impacts of climate change

Human health is now a critical component of the Arctic Council's sustainable development program. The AHHEG within the SDWG will explore ways to ensure greater integration of human health activities, strengthen cooperation and collaborations between Arctic Council working groups (such as the AMAP HHAG) and other Arctic cooperatives, and ensure the translation of research into actions that will improve the health of all Arctic residents.

CONCLUSION

A major accomplishment of the AHHI and the IPY has been the increased visibility of human health concerns of Arctic peoples within the Arctic Council resulting in the formation of the Sustainable Development Working Group Arctic Human Health Experts Group during the Norwegian Chairmanship (2006-2009) and a subsequent commitment of the Arctic Council to pursue human health as a priority during the Danish Greenlandic chairmanship 2009-2010. This commitment is anticipated to continue through the Swedish chairmanship which will follow 2011-2012. The IPY has seen a strengthening and expansion of existing collaborative circumpolar networks such as the International Circumpolar Surveillance of infectious diseases, and the Arctic Monitoring and Assessment's Human health Assessment Group, and the formation of new networks such as the International Network for Circumpolar Health Researchers and the community based Arctic Health Research Network. Such networks could form the basis for a Sustaining Arctic Observing Network for human health in the Arctic.

The IPY and the AHHI has increased circumpolar collaboration on human health research and other activities. Many collaborative research projects were started during the IPY because of national interest and the availability of new funding programs dedicated to IPY human health research activities. Other projects were possible because agencies and organizations redirected resources and in-kind support to ensure the success of this human health initiative. Many projects will continue beyond 2009 and the official end of the IPY.

Outreach education and communication activities are an important component of the IPY that will focus public and political attention on Arctic health issues. This is being done through a variety of venues that include conferences, symposia, workshops, electronic and printed media. While these efforts will continue beyond 2009, a list of early accomplishments is listed in **Appendix 1**.

APPENDIX I

AHHI Outreach Education and Communication Activities and Publications 2007-2009

An AHHI website has been established and is maintained at: www.arctichealth.org
The website contains detailed information on the aim and objectives of the AHHI, a listing of projects proposed as part of AHHI, linked to project descriptions, AHHI partners, publications and past and upcoming events.

Published reports include:

Proceedings 13th International Congress on Circumpolar Health June 12-16, 2006, Novosibirsk, Russia. "Gateway to the International Polar Year". A limited number of free hard copies will be available via the AHHI web site at www.arctichealth.org.

ICCH13 - The Gateway to Human Health in the International Polar Year-Summary of the Congress Held in Novosibirsk, Russia

Neil Murphy

Int J Circumpolar Health 2006; 65(4), 292-294

The International Polar Year and the Arctic Human Health Initiative

Alan J. Parkinson and Juhani Hassi

Human Ecology 2008 (In Russian)

The Circumpolar Health Movement Comes Full Circle

Neil Murphy

Alaska Med 2007; 49(2), 38-42

The International Polar Year 2007-2008; the Arctic Human Health Legacy

Alan. J. Parkinson

Alaska Med 2007; 49(2), 43-45

International Polar Year Arctic Human Health Initiative

Alan J Parkinson, Pamela Orr, Neil Murphy

Int J Circumpolar Health 2006; 65(4), 284-289

Special IPY Edition of the CDC's Emerging Infectious Diseases Journal, January 2008.

The issue can be accessed at (www.cdc.gov/eid/content/14/1/contents_v14n1.htm).

Circumpolar Health Supplements published as Contributions to the International Polar Year by the International Journal for Circumpolar Health

Indigenous Peoples of Northern Russia: Anthropology and Health

Andrew Kozlov, Galina Vershubsky, Maria Kozlov

Circumpolar Health Supplements 2008 (1)

Dietary transitions and contaminants in the Arctic: emphasis on Greenland

Jens Hansen, Bente Deutch, Oyvind Odland

Circumpolar Health Supplements 2008 (2)

Circumpolar Health Indicators: Sources, Data, and Maps

T.Kue Young

Circumpolar Health Supplements 2008 (3)

International Circumpolar Surveillance: Prevention and Control of Infectious Diseases: 1999-2008

Tammy Zulz, Michael Bruce, Alan Parkinson

Circumpolar Health Supplements 2008 (4)

Meetings, conferences, symposia, workshops

AHHI held a symposium and a steering committee meeting at the Annual Conference of the International Network for Circumpolar Health research in Tromso, Norway May 12-16, 2008. (http://uit.no/sih/circumpolar_health)

An AHHI workshop was held at the 6th International Congress of Arctic Social Sciences (ICASS VI) Nuuk, Greenland, August 25-29, 2008.

AHHI held a project workshop in association with The International Network for Circumpolar Health Research (INCHR; www.inchr.org) Circumpolar Health Research meeting, Banff, Alberta, Canada. April 20-25, 2007.

An international workshop on Climate Change and Human health in the Arctic was held February 13-15, 2008, Anchorage, Alaska, USA, as part of the Alaska Forum on the Environment (www.akforum.org). Proceedings are available at www.arctichealth.org and published in the International Journal of Circumpolar Health, 2009. 68 (1) 88-95.

The 13th International Congress on Circumpolar Health held in Novosibirsk, Russian Federation, June 12-16, 2006, and was the “Gateway to the International Polar Year” for the circumpolar health community.

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International Association of Circumpolar Health Publishers

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ISSN 1797-2361 (print)

ISSN 1797-237X (online)