

SDWG Progress Report to SAOs

Syktyvkar, Komi Republic, Russian Federation

26-27 April, 2006.

2006

Sustainable Development Working Group (SDWG)

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<http://hdl.handle.net/11374/675>

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Proposed IPY Activity Details

1.0 PROPOSER INFORMATION

1.1 Title of Activity

Research & Action Plan for Human Health Risk Reduction in the Arctic

1.2 Short Form Title of Proposed Activity

Human Health Risk Reduction in the Arctic

1.3 Activity Leader Details

Boris Morgunov

Ministry of Economic Development and Trade, Russian Federation

1.4 Lead International Organisation(s) (if applicable)

Arctic Council Sustainable Development Working Group

Arctic Monitoring and Assessment Program

1.5 Other Countries involved in the activity

Norway

Canada

1.6 Expression of Intent ID #'s brought together in this proposed activity

1.7 Location of Field Activities

Arctic

1.8 Which IPY themes are addressed

6. The human dimension in polar regions

1.9 What is the main IPY target addressed by this activity

1. Natural or social science

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2.0 SUMMARY OF THE ACTIVITY

Living in the circumpolar areas involves a number of risk factors associated with adverse health effects. Meteorological and geophysical exposures related to high latitude location are known to be of significant health importance. These factors include large fluctuations of geomagnetic field intensity and atmospheric pressure, cold and dryness, abnormal solar irradiation, high wind velocity etc. An increase in prevalence of some cardiovascular, respiratory, digestive and communicable diseases as well as disorders of nervous, immune,

and endocrine systems were reported from numerous health studies conducted in the Arctic /1/.

Although the presence and the latitude-dependent increase of POP levels in the Arctic regions are confirmed by many international studies, the ecotoxicological consequences still remain largely unknown. Therefore, in this stage of the international research effort on the health risk evaluation of persistent contaminants in the Arctic, the proposed project intends to coordinate the research activities on POP exposure in the arctic environment and draw conclusions on their possible human health effects. The high levels of persistent organic and some inorganic contaminants in the Arctic have already caused serious concern of the health conditions of indigenous populations. Human reproduction appears to be especially vulnerable to high levels of certain contaminants such as PCBs.

It has been recently reported that indigenous women residents of the Arctic experiencing the relatively low exposure to PCBs (as measured in serum at concentrations over 2.0 µg/L) are at increased risk of adverse outcomes of pregnancy (AMAP, 2004). Taking into consideration that the recommended level of concern for PCBs serum concentrations is of 5 µg/L for children and of 20µg/L for adults /3/, one may suggest that this phenomenon is resulted from either increased susceptibility of indigenous people to PCB exposure or from combined effect of environmental contaminations and specific geophysical and climatic stressors or both.

The harsh arctic climatic factors, in particular cold, are capable of acerbating and modifying the health effect induced by some inorganic toxicants, vibration and physical strain /4 /. In the meantime, next to nothing known about the interaction between cold stress and exposures of toxic organic contaminants, of which POPs are of special concern. From a public health perspective, one of the main issues is the possibility of unusual toxicity due to interaction of a multitude of contaminants and environmental stressors at exposure levels that are generally considered harmless for individuals.

The human uptake of persistent pollutants has been demonstrated by the finding of significant concentrations of contaminants in the maternal blood serum of indigenous pregnant women living in some part of the Arctic. This shows high levels of exposure of the population group to 'long-banned' organochlorine pollutants, and in particular to PCBs and DDT. The levels of these toxicants are amongst the highest currently reported when compared to other European populations of and close to that reported for the internationally recognized pesticide disaster area of the Aral Sea / 5 /. The discovery of an up to 25-fold increase in *p,p'*-DDT serum concentrations in women from the study areas, may indicate a fresh source of exposure, bearing in mind that DDE concentrations of the women are at levels comparable to other arctic populations /6/.

Currently there is a common understanding that POPs must be reduced at source. Assertive and far-reaching implementation plans are required.

2.1 What is the evidence of inter-disciplinarity in this activity?

Project involves disciplines associated with researches on the health-environment interaction such as

- modeling of effect at molecular and cellular levels;
- assessment of genetic susceptibility;
- identification of relevant and validated biomarkers of exposure and effects;
- identification of areas of increased risk;
- lifestyle characterization;
- health status evaluation;
- description of socio-economic conditions;
- assessment of exposure to environmental contaminants.

Activities under the project comprise systemic interactions between researchers, health care professionals and environmentalists from academic and medical institutions, hospitals, public health and ecological agencies.

2.2 What will be the significant advances/developments from this activity? What will be the major deliverables? What are the outputs for your peers?

The project implementation will allow

1. Better understanding the epidemiologic parameters of most common diseases in the arctic population that will facilitate and guide developing the action plans and programs to prevent, detect, and treat such diseases, ranging from cold stress to chronic conditions affected by the exposure to persistent contaminants.
2. Identification of individual genetic, proteomic, and behavioral data of natives and non-natives suffering from chronic conditions which may well be associated with combined exposure to environmental stressors and persistent contaminants specific to the Arctic.
3. Determination whether and how individual PCB congeners and some other persistent contaminants affect the reproductive health of arctic populations.
4. Development of recommendations on reduction of the human exposure to environmental contaminants in the arctic communities.
5. Evaluation, support, and implementation of new prevention strategies and management protocols for populations at increased risk of adverse health effects caused by combined exposure to POPs and severe environmental stressors.
6. Development of a responsive system for transferring health information within the Arctic Council, including tissue banks and environmental health information network for researchers and the public through both international and regional health information centers.

2.3 Outline the geographical location(s) for the proposed field work (approximate coordinates will be helpful if possible)

Kola Peninsula, Russia,
Amderma, Nenets Okrug, Russia.
Dudinka, Taimyr Peninsula, Russia,
Salekhard, Yamal Peninsula, Russia
Lavrentia, Uellen, Chukotka Peninsula, Russia

2.4 Define the approximate timeframe(s) for proposed field activities?

02/07 - 04/07
09/07 - 11/07
02/08 - 09/08

2.5 What major logistic support/facilities will be required for this project?

2.6 How will the required logistics be supplied? Have operators been approached?

Source of logistic support	Likely potential sources	Support agreed
Consortium of national polar operators		
Own national polar operator		Yes
Another national polar operator		Yes
National agency		Yes
Military support		
Commercial operator		Yes
Own support		Yes
Other		

2.7 If working in the Arctic regions, has there been contact with local indigenous groups or relevant authorities regarding access?

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3.0 STRUCTURE OF THE ACTIVITY

3.1 Origin of the activity

This is a new activity developed for the IPY period

3.2 How will the activity be organised and managed? Describe the proposed management structure and means for coordinating across the cluster.

A prerequisite for understanding the combined effects of environmental stressors and contaminants is the conduct of studies of genetic polymorphism and related proteomic profiles in arctic populations in order to describe individual susceptibility to adverse effects caused by contaminants. Differences in sensitivity to xenobiotic substances may in part be due to individual variations in metabolic capacity which is to be also studied.

In addition, identification of reliable and applicable biomarkers of exposure will be studied in order to estimate the validity of assumption of effect. Although toxicology and biomarker research provide the basic understanding of combined effects, their applicability for development of preventive strategies and action plans are generally limited. Evaluation of the combined effect of environmental stressors and global contaminants in the Arctic requires additional information viz. experimental modeling, health statistics, epidemiological, nutritional and socio-economic data.

These specific activities will be organized in the form of:

- a follow-up study involving those 316 mother-child pairs and 1540 adult indigenous people surveyed during the 2001-2002 Russian Arctic PTS study;
- a cross-sectional epidemiologic studies involving indigenous and non-indigenous sub-populations with comparable levels of POP exposures living in different geographical areas of the Arctic;
- statistical analysis of data available from annual environmental and public health reports provided by local hospitals, as well as reports by hygienic and socio-demographic monitoring services from arctic regions and districts;
- information dissemination, experience transfer and professional training to facilitate the development and implementation of both national and local action plans for improvement of the environment and health care systems.

3.3 Will the activity leave a legacy of infrastructure and if so in what form?

Project will leave an infrastructure of existing national and institutional networks that will link researchers throughout the arctic region, as well as socio-environmental and health monitoring services that will allow the reduction of health risks associated with global persistent contaminants in the Arctic.

Proposed activities are intended to facilitate a legacy of indigenous people participation in Arctic health studies and their planning, implementation and evaluation of results.

3.4 Will the activity involve nations other than traditional polar nations? How will this be addressed?

No

3.5 Will this activity be linked with other IPY core activities? If yes please specify

This activity is linked to the program proposed by the Sustainable Development Working Group

3.6 How will the activity manage its data? Is there a viable plan and which data management organisations/structures will be involved?

The data will be managed according with the procedure established by the national regulations and IPY policy

3.7 Data Policy Agreement

Will this activity sign up to the IPY draft Data Policy (see website)

Yes

3.8 How will the activity contribute to developing the next generation of polar scientists, logisticians, etc.?

To use the above information in the selection and training of the personnel.

3.9 How will this activity address education, outreach and communication issues outlined in the Framework document?

The recommendations will be based on the preponderance of scientific evidence for lowering risk of chronic disease and promoting health.

3.10 What are the proposed sources of funding for this activity?

Federal and local sources of funding of Russian Federations. The total budget is expected to be of \$350,000

3.11 Additional Comments

The results of the investigation can be compared with the findings obtained in the 2001-2004 AMAP study on PTS in the Russian Arctic

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4.0 CONSORTIUM INFORMATION

4.1 Contact Details

ANNEX 11 to SDWG Progress Report to SAOs
27 March 2006

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