ARCTIC MONITORING AND ASSESSMENT PROGRAMME
The AMAP Human Health Secretariat, Department of Environmental and Occupational Medicin, Vennelyst Boulevard, Bldg. 260,DK 8000 Aarhus C, Denmark,
Phone: 45 89 42 6157, Fax: 45 89 42 61 99
e-mail: jch@mil.au.dk/uv@mil.au.dk

NEWSLETTER
AUGUST 2003, 4.

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AMAP
Arctic Monitoring and Assessment Programme

AMAP

HUMAN HEALTH NEWSLETTER

NO. 4. AUGUST 2003

The **Human Health Expert Group** has changed to the **Human Health Assessment Group** Now referred to in abbreviation **HHAG.**

The next **HHAG** meeting will be held in Denmark 3-6th October, at

Sophienberg Slot,

Rungsted Strandvej 219

2960 Rungsted Kyst

Phone: 45 76 09 00

Fax: 45 76 35 25

e-mail: info@sophienberg.dk

AMAP Assessment 2002: Human Health in the Arctic.

Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. xiv-137 pp.

The scientific report on human health in the Arctic from phase 2 of AMAP is now published.

The report consists of 11 chapters authored by members of the AMAP Human Health Assessment Group and some associated experts.

Chapt. 1: Introduction gives the background for the human health assessment, describes the concept of combined effects of environmental stressors and the scope of the report. Chapt. 2: Ethno-cultural Adaptation of the peoples of the Arctic (P. Bjerregaard) provides an overview of the peoples of the Arctic and describes as a case study of the Inuit health and sociocultural changes in a historical perspective. Chapt 3: Health Status of the Arctic Residents. (J. Berner) summarises the present health status in the Arctic populations. Chapt 4: Priority Contaminants, "New" Toxic Substances, and Analytical Issues (I. Burkow and J-P Weber) describes the properties of both the "classical" contaminants and the "new" chemicals which will be included in future monitoring programmes. Finally the chapter gives an overview of the analytical quality control and quality assurance programme developed by the group. Chapt 5: Biological Monitoring: Human Tissue Levels of Environmental Contaminants. (J. Van Oostdam and N. Tremblay) summarises the present knowledge of contaminants in human samples collected during phase 1 and the much more extensive programme during phase 2. Chapt. 6: Toxicological Properties of Persistent Organic Pollutants and Related Health Effects of Concern for the Arctic Populations. (E. Bonefeld-Jørgensen and P. Ayotte) describes the Human Health Effect Programme developed by the Human Health Assessment Group and provides for the first time an overview of the potential health effects from the actual exposure levels of contaminants in the actual mixture in the Arctic. Chapt 7: Recent Dietary Studies in the Arctic (B. Deutch) compiles present knowledge about dietary intakes among Arctic peoples and evaluates traditional food as a source of anthropogenic substances. Chapt 8: Lifestyle Factors as Determinants of Health in Arctic Communities, with emphasis on Pregnant Women and

Adverse Pregnancy Outcome. (J.Ø. Odland) This chapter has focus on other lifestyle factors such as smoking, alcohol consumption and working conditions, which by them selves and in interaction with the contaminants influence health status. Chapt 9: The Effect of Arctic Pollution on Population Health. (E. Dewailly and P. Weihe) deals with the public health perspectives of the contaminant exposure as found in the Arctic at present, with focus on the exceeding of national and international guidelines for individual contaminants and on the combined effects of the contaminants. Chapt. 10: Risk Reduction Strategies for Arctic Peoples. (A. Gilman) reviews the risk reduction case studies already carried out in the individual Arctic countries and address the long-term impacts of risk reduction strategies and scenarios for changing global conditions. Chapt. 11: Conclusions and Recommendations concludes on the previous chapters and gives recommendations for future directions. For comparison also the conclusions and recommendations from phase 1 are included.

The report can be ordered from: AMAP Secretariat, P.O. Box 8100 Dep, N-0032 Oslo, Norway. It is also published as electronic documents, available from the AMAP website at www.amap.no. - as well as this Newsletter is.
Jens C. Hansen

Suggestions for Future Activities for the Human Health Assessment Group (HHAG) in AMAP Phase 3.

In April 22-25 the AMAP human Health Assessment Group HHAG had a meeting in Kiruna Sweden. The main topic of this meeting was to finalise a document for the AMAP board and Working Group on

The main objective of the proposal is to continue co-operation on health issues, including assessing the relationships between pollution and health as encouraged in the Inari Declaration (2002).
To fulfil this the following strategy was adopted:

1) To continue monitoring of human contaminant exposure levels in selected areas in order to establish and follow time trends of exposure and to complete the geographical coverage. The monitoring part should include both the "classic" contaminants, dioxin/dioxin-like effects and the "new" contaminants of concern. Also the quality assurance and quality control (QA/QC) procedures already established must be sustained to ensure reliability of analytical data.
2) Apply an integrated assessment approach that can examine the multiple factors affecting health in Arctic populations and make more use of multidisciplinary research teams. This includes epidemiologic studies of infectious and non-infectious diseases. A special problem is the hormone related cancers in relation to exposure to hormone disrupting substances. Due to small population sizes in the Arctic this kind of studies might require combining similar regional cohorts into a large circumpolar cohort.
3) Further develop and implement the AMAP "Health Effect Monitoring Programme" at all levels in key geographical areas. The results from biomarker studies as well as from studies on genetic susceptibility should be integrated into epidemiological studies
4) Develop strategies for reducing human exposure to contaminants that consider economic, social, cultural, and medical issues. This will include prompt evaluation of results of new Arctic health research, systematic in-depth evaluation of Arctic diets and of the influence of lifestyle-factors e.g. smoking on body burden of contaminants, promotion research that can be used for the development of national and locally appropriate policy and guidelines in the Arctic countries. Finally there is a need to evaluate the effectiveness of interventions.

The document summarised here expresses the opinion of the HHAG on appropriate future activities. As the AMAP Working Group has not yet decided on an overall strategy plan for AMAP in phase 3 the development of an implementation plan for the human health part of the programme has to wait for the directions given by the Working Group.

Jens C. Hansen

International Union for Circumpolar Health

The International Union for Circumpolar Health (IUCH) was established in 1986 after some years' discussion at the International Congresses for Circumpolar Health. Since the first congress in Fairbanks in 1967, these triennial congresses had become the pivot of international cooperation in health research about the Arctic but there was a need for extending the cooperation to the years between the congresses. The current president of IUCH is *Peter Bjerregaard*. The Union website has more information: www.iuch.org.

The objectives of the Union are to promote international cooperation in circumpolar health, to encourage and support research and exchange of scientific information in the circumpolar health sciences, to promote education and public awareness of circumpolar health, to provide a means of communication with other scientific organizations, and to promote and encourage the participation of indigenous peoples in circumpolar health affairs.

IUCH is not a membership based organization but a union of five adhering bodies: the American Society for Circumpolar Health, the Canadian Society for Circumpolar Health, the Siberian Branch of the Russian Academy of Science, Medical Section, the Danish/Greenlandic Society for Circumpolar Health and the Nordic Society for Arctic Medicine. Affiliated members include among others the Scientific Committee for Antarctic Research (SCAR), and WHO has observer status in the IUCH council. IUCH in its turn is observer to the Arctic Council and is represented in the International Arctic Science Committee (IASC).

The IUCH Council conducts its business at yearly meetings. The most important issues are securing that an international congress is held every three years and the issuing of the International Journal for Circumpolar Health. The international congresses have taken place in Fairbanks (1967), Oulu (1971), Yellowknife (1974), Novosibirsk (1978), Copenhagen (1981), Anchorage (1984 and 1996), Umeaa (1987), Whitehorse (1990), Reykjavik (1993), and Harstad (2000). The 2003 congress will take place in Nuuk. The International Journal for Circumpolar Health (formerly Arctic Medical Research) is issued jointly by the University of Oulu, IUCH, and the Nordic Society for Arctic Medicine. It is a peer-reviewed

journal open to contributions on all aspects of health and health research in the Arctic and Antarctic.

Peter Bjerregaard

Encyclopaedia of the Arctic

The purpose of the encyclopaedia is to provide a high-quality reference source, which brings together information on the diverse range of factors influencing the Arctic. It is planned to become an indispensable tool for academic courses and for research. It is also hoped that the book will be regarded as an important source of information and scholarship by the peoples of the Arctic themselves.

The *Encyclopaedia of the Arctic* will include some 1300 entries, arranged alphabetically, ranging in length from 500 words up to 5,000 words for the longer thematic entries and survey articles. It will be a two-volume work, illustrated with photographs, tables, maps, and diagrams, and equipped with an index.

Entries will be included on individuals (such as prominent political and cultural figures, explorers, and community leaders); the circumpolar peoples and their cultures; language and art; flora and fauna; physical geography, geology, and minerals; climate and the environment; and economics and politics, as well as broad survey articles giving historical overviews and focusing on cross-disciplinary issues.

The publishers of the encyclopaedia are now Rout ledge, a division of Taylor and Francis and the Encyclopaedia is being developed in the Rout ledge New York office. Please check the web-site for further information:

http://www.fitzroydearborn.com/london/arctic_nfs_index.htm

Peter Bjerregaard

Some Activities Related to United States Arctic Health Research

A participating member of the HHAG, Philip S. Chen, Jr., Ph.D. (Senior Advisor to the Deputy Director for Intramural Research, National Institutes of Health, Bethesda, Maryland), is currently the Arctic Research Representative of the U.S. Department of Health and Human Services. This responsibility involves membership on:

1. The Interagency Arctic Research Policy Committee (chaired by the National Science Foundation) responsible for U.S. domestic research matters as mandated by the Arctic Research and Policy Act of 1984. IARPC reports bi-annually to the President and Congress on the arctic research accomplishments of twelve Federal agencies, and bi-annually (in alternate years) compiles a rolling 5-year arctic research plan, each of which includes a section on health. These reports are also published in the journal, "Arctic Research of the United States", available in hard copy from the NSF, or on the web: http://www.nsf.gov/od/opp/arctic/arctrsch/start.htm.

2. The Arctic Policy Group (chaired by the U.S. State Department) responsible for international arctic policy matters. This body oversees U.S. participation in Arctic Council activities, including the Sustainable Development Working Group, and the Arctic Monitoring and Assessment Program, with its component Human Health Assessment Group.

Under the 1984 Act, a Presidentially-appointed Arctic Research Commission periodically issues a "Report on Goals and Objectives for Arctic Research"; which recently recommended..."a comprehensive interagency study of Arctic Health. NIH has agreed to be the focal point for this effort focused primarily on the environmental health questions outlined by the Arctic Monitoring and Assessment Program and on the incidences and trends in the major causes of morbidity and mortality in the arctic...". Thus, the Arctic Research Commission is requesting an Arctic Health Research Plan that is based on broader inputs than the usual bi-annual exercise, that is based mainly on DHHS inputs.

In pursuing the development of the recommended Interagency Arctic Health Research Plan, it appears that much valuable input can be derived from the contents of the April, 2003, Kiruna deliberations of the HHAG, as outlined in the paper, "Suggestions for Future Activities for the Human Health Assessment Group in AMAP Phase 3". The suggested future activities of the HHAG, if endorsed by the AMAP-Working Group, could constitute important components of the proposed Plan.

The Plan might also benefit from inputs from other venues, such as the ICCH-12, to be held in Nuuk, Greenland, in September, 2003, and from the reports of workgroups responding to the Alaska State Legislature resolution regarding research and development (SJR 44). The resolution asked the University of Alaska and Alaska Science and Technology Foundation to work with the North Pacific Research Board and the US Arctic Research Commission to develop a state R&D Plan, with objectives that included: protect the health of Alaskans and the environment of Alaska, and strengthen and maintain the health of state research institutions.

Philip S. Chen, Jr. Ph.D.
Senior Advisor to the Deputy Director for Intramural Research
National Institutes of Health
Bldg. 1/Room 140
Bethesda, MD 20892-0151 Tel: 301-496-3561

The Human Health programme in Greenland 1997-2001. Summary of National report.

The AMAP Human Health programme in Greenland has monitored persistent organic pollutants and heavy -metal contaminants as blood levels among several population groups in Greenland during 1997-2001. The general protocol for the sample collection and analyses were in accordance with the program agreed upon by the international Human Health Expert Group in 1992. The programme has been approved by the Ethic Committee for Scientific Studies in Greenland. The first phase of this programme was carried out from 1994-96.

The primary target group was pregnant women and infants; from 1999 these were supplemented with men and non-pregnant women of fertile age to obtain larger and more representative population samples. Dietary markers (Selenium and fatty acids) were also determined and questionnaires supplied information regarding demographic, anthropometric and lifestyle factors (smoking and dietary habits).

Heavy metals

In both pregnant women, non-pregnant women and men the same general picture was drawn regarding blood levels of total mercury (Hg), cadmium (Cd), and lead (Pb). The lowest mean blood levels of mercury were found in Nuuk (4.5 microgram/liter) slightly higher levels were recorded in Disco Bay (12.5 microgram/liter) and the East Coast (10.5-26.0 microgram/liter) and the highest in Uummanaq (52.0 microgram/liter). These mean blood levels were also reflected in the number of samples that exceeded the US-EPA guidelines for blood mercury

Mean cadmium and lead blood levels were only moderately high. The Cd levels ranged from 0.66 microgram/liter in Tasiilaq to 1.65 microgram/liter among men in Ittoqqortoormiit. The higher Cd levels reflected the smoking levels among the subgroups. The Cd levels among smokers in Uummanaq were found to be double as high as among non-smokers.

The Pb levels ranged from 23.8 microgram/litre among pregnant women in Tasiilaq to 70.7 micrograms/liter among men in Ittoqqortoormiit, again the level of smoking may have influenced the level. The Pb guideline value of 100 microgram/liter was exceeded only by low percentages of blood samples among these the highest were 14 % in Uummanaq and 10% in Ittoqqortoormiit.

Organochlorines

The geographical pattern of blood levels of persistent organic pollutants was slightly different from the pattern of heavy metals. The highest mean blood concentrations of PCB were found in Ittoqqortoormiit especially among men. This was first shown in the geographical pilot study collected in 1997 and the levels were confirmed by measurements among larger population samples in 1999-2000.

Hexachlorophene, betaHCH and Toxaphenes were relatively evenly distributed geographically but chlordane's, DDTs and particularly PCBs, in fact the PCB levels were

about 3-4 times higher than in the other locations, and should be considered the highest measured among Arctic populations (AMAP International report, Human Health 2002)

The mean blood levels of PCBs were also consistent with the number of blood samples exceeding the Canadian guideline values for PCB-Aroclor1260.In all locations except Disco Bay and Nuuk (1999) 93-100% of blood samples exceeded the 5 microgram/liter "Level of Concern" for pregnant (and fertile) women and among men in Ittoqqortoormiit 60% of samples (1997) and 43%(2000) exceeded the 100 microgram/liter guideline "Level of Action"

Dietary Markers: Fatty acids and Selenium

The ratio of plasma fatty acids (n-3/n-6) indicates the relative consumption of traditional and imported food of which a high n-3/n-6 ratio indicates a high intake of traditional food (of marine origin). The ratio was highest in Nanortalik (0.66) and Uummanaq (0.60) and lowest in Nuuk (0.21). However it was also relatively low among men in Ittoqqortoormiit (0.27) year 2000.

Selenium whole blood selenium was also highest in Uummanaq namely 354 microgram/liter and lowest in Nuuk (140 microgram/liter). A high Selenium level indicates a high intake of meat from marine animals and in particular of whale muktuk.

Dietary surveys

A dietary survey by semi quantitative food frequency questionnaire performed among 190 persons on the East Coast showed that the relative intake (weight) of traditional food was 25-30%, and slightly higher in the North, Ittoqqortoormiit, than in the South, Tasiilaq. The food was more versatile in Tasiilaq both concerning composition of traditional food which contained more fish and of imported food, which contained more fruit and vegetables. The mean value of the total intake of traditional food was about the same as found in a previous study on the West Coast (Pars 2000). Thus the total intake of traditional food can therefore not be considered different between east and west Greenland although there were various differences in composition. One of the more important differences was that polar bear is consumed frequently on the East coast but is not common on the West Coast except in the north.

Dietary exposure from contaminants

Calculations using dietary survey data and animal contaminant data showed that seal blubber was the major contributor and whale blubber the second contributor of all the

lipophilic organic pollutants, in reality all the pesticides and PCBs measured in the programme. Using information on the relative bioavailability of metals in different animal tissues it was furthermore calculated that seal-(and whale meat) were the main contributors of methyl mercury and that seal kidney was the predominant contributor of cadmium. Comprehensive contaminant data were not available from the east coast but the higher levels of PCB and DDT in ring seals (chapter 3) were consistent with the higher blood levels found in human beings.

Predictors of high contaminant levels

Multiple linear regression analyses of results from Disko Bay 1994-97, the geographical survey 1997 , Uummanaq 1999, and the latest results from the East Coast 2000 showed that the main predictors of high blood levels of persistent organic pollutants were:

age, smoking (cotinine), and high n-3/n-6 ratio indicating high intake of traditional seafood, and that district was a major determinant.

Time trends

In Uummannaq the mean blood level of mercury increased significantly between 1979 and 1999 whereas Pb dropped significantly. Previous measurement of organic pollutants was not available and the time period within the AMAP study too short to detect time related changes.

Bente Deutch

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Tel+45 32660200,
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News

A CD containing figures and tables from the Assessment Report 2002 is now available

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