

Project information

Project title

Human health and society -The effects of hazardous substances and climate change on human health: Work package

Year

2011/2012

Project leader

Jon Øyvind Odland, UiT

Participants

UiT & SSH, NILU, NORUT, Akvaplan-niva/NIVA, NRPA, NGU , NVH

Associated participants

- International partners:

Canada: Université Laval, Axe de recherche en santé des populations et environnementale Centre de recherche du CHUQ Direction de la Toxicologie Humaine-INSPQ, Quebec

Finland: University of Oulo

Island: Universitetet i Akureyri

Russland: Northern State Medical University, Arkhangelsk, Monchegorsk hospital
Murmansk Oblast, North-West Public Health Research Center, St-Petersburg

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Flagship

Hazardous substances, Theme: Human health and society

Funding Source

Fram Centre, Helse Nord, internal

Summary of Results

Human health effects 2011:

- **Exposure of the newborn and changes during pregnancy:** Miljøgifter i svangerskapet og ammeperioden (MISA) RCN number 175172 (2009 - 2011) PhD student Solrunn Hansen completed her PhD degree the 7th of September. She reported new interesting data on changes in concentrations of POPs and toxic elements during pregnancy and 6 weeks postpartum. Her findings have implications for future studies on contaminants and metabolic syndrome.
- **Total exposure of newborns and selection bias in MISA:** Miljøgifter i svangerskapet og ammeperioden (MISA). NKS K25/06. PhD student Anna S. Veyhe has submitted one paper on selection bias of the MISA study. POPs and HPCs have also been analysed in mekonium. Concentrations correlate well with the maternal concentrations of POPs. These data are currently being published. Siloxanes has also been analysed in a subgroup of this cohort showing very limited uptake through the skin. In addition some of the NOWAC samples where parabens were determined were also analysed and low levels were also found here. This is new data highly relevant for human risk assessment and cosmetics.
- **Follow up of children:** Miljøgifter i svangerskapet og ammeperioden (MISA). Helse Nord SFP 1003-11 (2011-2014) PhD student May 2011 The PhD student Therese Haugdal Nøst has started analysing samples from the Tromsø study in order for to better understand changes with time and predict the future and potentially validate models.
- **Perfluorinated compounds and type 2 diabetes:** Gene environment interactions in the Norwegian Women and Cancer study (NOWAC). RCN number ES471766 (2011-2014). This project has been delayed as the postdoc did not start the position before October 2011. These analysis will be done in 2012.
- **Parabens in the NOWAC study:** Parabens have been determined in 300 women from the Norwegian women and cancer where a strong association between the use of body lotion and concentrations of parabens were found. This allows us to study the incidence of breast cancer among the women who have responded to this questionnaire. This has also been published and it is now referred to in the Scientific committee of EU.
- **SAMINOR2:** Public health survey; needs additional funds for sampling, data entry and research hours. A proposal was submitted in June 2011 and was funded in October 2011. Questionnaires will be distributed January 2012 and the samples for the clinical study will start fall 2012.
- **Sør-Varanger and Arkhangelsk – an integrated case study:** Reindeer samples from the border area has been analyse for POPs and toxic elements and the results indicate that the concentrations in meat are not elevated as indicated in lower trophic levels. This is very important information for local risk assessment and will be communicated to the public when the final data

analysis is ready. Several workshops has been arranged during 2011 and a large proposal was submitted the 14th of Nov to the Kolarctic program (Listed below). This particular project was focusing on food security and human health. Due to a number of other submitted proposals to this program it was decided to narrow the topic more than initially planned. A more integrated project will be pursued further in 2012. As for analysis it was agreed that each institution continues their work to build a larger database for the area increasing our chances of a larger integrated project.

- **Analysis of the impact on humans & society:** This work has been reported separately by NORUT and a proposal listed below was submitted 14 th of November to the Kolarctic program where this has been integrated. A comprehensive project on human health and wellbeing in Russia, Norway, Sweden, Iceland, and Canada is in progress and partly funded because of this flagship grant.
- **Exposure scenarios for the Northern Norwegian population 2011:** Research linked to ArcRisk (FP7-ENV-2008-1) which is a project supported under the Seventh Framework Programme of the European Community for research, technological development and demonstration activities. Grant agreement: 226534 The ARCRISK project, the Helse Nord funded PhD student and historical samples from “the Tromsø study” samples are now being processed. The initial data are very promising and these data will change some of the basic concepts of understanding accumulation with time in humans. Co finances have allowed for a broader spectrum of analytes to be analysed and thus lifting the scientific quality and applicability of the findings. These data gives a unique possibility to validate models allowing for predictions of exposure for future generations. All data from MISA are ready and will also be used to connect models and real data. Food frequency data are essential for this. A large number of hair samples (ca. 5000) from the Tromsø VI study has already been analysed for Hg (NRC project 185639, Environmental mercury and human health in Arctic Norway, MilGenHel). The results from the analyses are currently being compared with results from dietary questionnaires. An integration of these results with new results from the activities described above will give valuable information concerning possible synergistic effects of Hg and POPs. Submitted proposals including partners 2011.
- **Health effects of mixtures:** Food and health security in the Norwegian, Finnish and Russia border region: linking local industries, communities and socio-economic impacts (samarbeidsprosjekt)mellom: lead partner Framsender (NILU; Akvaplan-niva; NRPA; NORUT; UiT, Institute of Community Medicine; Uit, SVFAK); other national partners: Fylkesmannen i Finnmark; international partners: Centre for Arctic Medicine, Thule Institute, University of Oulu, Finland; Finnish Meteorological Institute, Helsinki, Finland; Mechnikov Northwest State Medical University, St-Petersburg, Russia; Murmansk County Birth registry, Monchegorsk, Russia; Institute for Industrial Ecology Problems of the North, the Kola Science Center, the Russian Academy of Science (INEP KSC RAS) Apatity, Russia) 800 000 euro.

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Published Results/Planned Publications

- Hassan AA, **Sandanger TM**, Brustad M. [Level of selected nutrients in meat, liver, tallow and bone marrow](#) from semi-domesticated reindeer (*Rangifer t. tarandus L.*). *Int J Circumpolar Health*. 2011 Nov 8:0. [Epub ahead of print]
- Rylander C, Dumeaux V, Olsen KS, Waaseth M, **Sandanger TM**, Lund E. [Using blood gene signatures for assessing effects of exposure to perfluoroalkyl acids \(PFAAs\) in humans: the NOWAC postgenome study](#). *Int J Mol Epidemiol Genet*. 2011 Aug 30;2(3):207-16. Epub 2011 Jun 3
- Waaseth, M., Olsen, K.S., Rylander, C., Lund, E., Dumeaux, V. (2011) [Sex hormones and gene expression signatures in peripheral blood from postmenopausal women - the NOWAC postgenome study](#). *BMC Medical Genomics*, 4, 29. doi:10.1186/1755-8794-4-29.
- Hansen, S., Nieboer, E., Sandanger, T.M., Wilsgaard, T., Thomassen, Y., Veyhe, A.S., Odland, J.Ø. (2011) [Changes in maternal blood concentrations of selected essential and toxic elements during and after pregnancy](#). *J. Environ. Monit.*, 13 , 2143-2152. doi:10.1039/C1EM10051C.
- Sandanger, T.M., Huber, S., Moe, M.K., Braathen, T., Leknes, H., Lund, E. (2011)[Plasma concentrations of parabens in postmenopausal women and self-reported use of personal care products: the NOWAC postgenome study](#). *J. Expo. Sci. Environ. Epidemiol.*, 21, 595-600. doi:10.1038/jes.2011.22.
- Rylander, C., Sandanger, T.M., Petrenya, N., Konoplev, A., Bojko, E., Odland, J.Ø.(2011) [Indications of decreasing human PTS concentrations in North West Russia](#). *Global Health Action* 4, 8452. doi:10.3402/gha.v4i0.8452.
- Rylander, C., Odland, J.Ø., Sandanger, T.M. (2011) [Climate change and environmental impacts on maternal and newborn health with focus on Arctic populations](#).
- Anda EE, Nieboer E, Wilsgaard T, Kovalenko AA, Odland JØ. [Perinatal mortality in relation to birthweight and gestational age: a registry-based comparison of Northern Norway and Murmansk County, Russia](#). *Paediatr Perinat Epidemiol*. 2011 May;25(3):218-27. doi: 10.1111/j.1365- 3016.2011.01189.x. Epub 2011 Mar 21.
- Petrenya N, Dobrodeeva L, Brustad M, Bichkaeva F, Menshikova E, Lutfaliev G, Poletaeva A, Repina V, Cooper M, Odland JØ. [Fish consumption and socio-economic factors among residents of Arkhangelsk city and the rural Nenets autonomous area](#). *Int J Circumpolar Health*. 2011 Feb;70(1):46-58. Epub 2011 Feb 16.
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Communicated Results

This activity had a lot of attention in the media this year and this will be further addressed in the separate report on dissemination and communication.

Interdisciplinary Cooperation

The projects clearly benefits from the inter-disciplinary cooperation within the new Fram Center. This is clearly expressed in the proposal submitted to the Kolarctic programme where we integrate human health, environmental contaminants, food security, risk perception and socioeconomic aspects. Funding will also be sought elsewhere.

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Budget in accordance to results

The funding from the Fram Center has enabled inter-disciplinary interactions to a much larger extent than what was done before. This has resulted in an extensive proposal submitted to the Kolarctic programme as reported above.

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Could results from the project be subject for any commercial utilization

No

Conclusions

- a) Indicate future research and/or perspectives which the project results have led to
- b) List and describe new methods or techniques that have been developed during the project or that the project has revealed a need for
- a) The perspectives are outlined in the report above. The most important result so far is the interdisciplinary, integrated approach. All sides of the scientific relevant issues are covered through the collaborating groups in different countries. The intention is to further develop this collaboration with extensive scientific production in the near future; basic natural science, social science, epidemiology and clinical outcomes from a medical perspective.
- b) The innovative potential is in the trans-disciplinary and inter-disciplinary approach with close integration of the different specialities. To fulfil this aim there is a need for high level expertise in all methodological issues, eg., statistics, epidemiology, molecular epidemiology, social science, anthropology and clinical research.

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