THE RESEARCH PLANS FOR ARCTIC HEALTH

Eva Cecilie Bonefeld-Jørgensen, Professor, Director
Centre for Arctic Health, Department of Public Health
The Health Faculty, Aarhus University
Changes in living conditions

Lifestyle changes, social change, and changes in society and the environment are major determinants of health among the Inuit.

Today only 15% live in settlements, earlier 100%
Transition from hunters to town life

- Transition from physical activity to more sedentary life
- Transition from traditional marine diet to more westernized diet and lifestyle e.g. higher intake of alcohol and higher smoking rate (GRL 66% vs. 20% in DK)
- Together, these factors including increasing life-expectancies will change the disease pattern in the Arctic
Bio-accumulation up through the marine food chain of the Persistent Organic Pollutants (POPs)

These POPs can exert a health risk.

However, the marine diet contains important nutrition factors such as n-3 omega fatty acids and antioxidant.

That’s the Arctic Dilemma.

In overall the Inuit have reduced the intake of marine diet to 24%.
Mortality rates per 100,000 1924-1998

Age standardized to the Greenlandic population year 2000

(Bjerregaard & Young 1998)
Diseases on increases in the Arctic

- **Breast cancer:**
  - Greenland vs. westernized countries
  - GRL: Before 1970ies approx. 0-6 per 100,000 women
  - GRL: 2008: 46.4 per 100,000 women.
  - DK: 2010: 100 per 100,000 women (2012; 144/100,000)
  - USA: 2008: 124 per 100,000 women (2001 to 2008)

- **Diabetes:**
  - 1962: 0.06% of the GRL population (probably some undiscovered)
  - 2010: approx. 10% of the GRL population (cross-sectional studies)

- Overweight: studies have shown an increase in overweight and obesity for the past decades
  - More data are however needed.
How to act when a Health problem is registered

Health problem

Are determinants known? Yes

Do we know Yes

Action

how to modify determinant?

No

Research

This research often needs to be country specific.
List of suggestions for interdisciplinary projects
(results from the international ARC-Health workshop April 2013)

1. Reproduction – (birth cohort GRL); Lifestyle changes and environmental contaminants
2. Breast-ovarian-cancer: Lifestyle changes and environmental contaminants
3. Cardiovascular diseases, pre-diabetes and diabetes
4. Vitamin D - thyroid hormones– metabolism- inflammatory markers vs. contaminants
5. Environment– gene interaction; Pathogenic mechanisms of identified disease/risk genes
6. Changes in diet intake vs. changes in Microbiota profile in the gastrointestinal canal, upper respiratory tract, and skin (plays a significant role for human obesity, autoimmune diseases including diabetes, and allergies).
7. Molecules (e.g. lectin pathway) for infections in Greenlanders and other Inuit (the innate immune defense)
8. Occupational health: Asthma and allergy in the fishing industry
9. Drinking water quality: chemical and microbiological

The Dean of the Health Faculty promised to support 3 PhD ARC-Health studies if the studies and the proposed candidate were found qualified.

Until now ARC-Health did not receive any money from the ARC-AU programme but support to the ARC-Health workshop in April 2013.
Applied PhD study:
The influence of traditional Inuit diet, vitamin D and Persistent Organic Pollutants on markers of inflammation

A collaboration between endocrinologist and toxicologist at Aalborg University (AAU) and Aarhus University (AU), respectively

- **Study participants**
  - Stig Andersen AAU, MD, phd, Head endocrinologist,; Eva C. Bonefeld-Jørgensen, AU, phd, prof. dr.; PhD candidate Louise H. Schæbel AAU / AU

- **The three sub-studies of the PhD**
  - **Part 1. Inflammation and diet**
    Assesses the relationship between diet and inflammation by measuring markers of inflammation (hsCRP and YKL-40).
  - **Part 2. Inflammation and vitamin D**
    Assesses the influence of vitamin D levels for markers of inflammation taking into account also the intake of traditional Inuit diet.
  - **Part 3. Inflammation and Persistent Organic Pollutants**
    Assesses the influence of POP’s on markers of inflammation taking into account also the intake of traditional Inuit diet, and elucidates the pathway of oxidative stress by measuring total antioxidant capacity.
PhD study planned to be applied spring 2014:  
*Dental status among patients with diabetes in Greenland.* (A pilot study is currently carried out)

A cross-disciplinary project between Aarhus University, Quinn Ingrid's Hospital (DIH), Nuuk & the Steno Institute CHP

- The purpose of the study is to analyze the role of dental status in impaired glucose regulation in Greenland and its interaction with low-grade inflammation.

- **Study participants:**
  - Torsten Lauritzen MD, PhD, Depart. of Public Health, Department of General Practice, University of Aarhus
  - Michael L. Pedersen MD PhD, DIH & Greenland Center for Health Research
  - Marit Eika Jørgensen, MD PhD, Steno Diabetes Center,
  - PhD candidate: Sabina Eugenius, Dental Clinic, Nuuk, Greenland

- **The pilot project showed until now:**
  - Of approx. 300 diabetes patients 100 was excluded because of birth outside Greenland. Aiming the remaining 200; 64 were studied.
  - Most common reason for exclusion was: no teeth, lack of telephone contact, holidays, medication and lack of desire to participate.
  - 31% knew about the link between oral health and diabetes regulation
  - 79.7% had moderate to severe pardontose
  - 74.6% had been to a dental hygienist within 2 years
  - No difference in metabolic regulation between the group with no / mild and moderate / severe pardontose
PhD study planned to be applied spring 2014: *Breast Cancer in Greenland and risks factors*

A cross cooperation between Centre for Arctic Health, AU and Quinn Ingrid's Hospital, Nuuk. Copenhagen University and Aalborg University are planned to be a part of the genetic and inflammatory part, respectively.

- **Background:** Breast cancer in the Arctic has increased dramatically from almost no cases before the 1970ies to a level being approximately 50% of the Danish BC level being one of the highest in Europe/Western world.

- **Aim:** The PhD study will focus on transition in lifestyle, environmental contaminants, genetic susceptibility, endocrine disruption and co morbidity.


- The PhD study is based on a previous investigation (2000-2003) showing that lifestyle, diet, and environmental contaminants (e.g. PFCs, PCBs) are breast cancer risk factors.

- Immune defense parameters in cases and controls are planned (if money can be found) to be a part of the study.

- For this “new PhD” study, interviews and blood sampling from cases and control have been ongoing since 2011 (approx. total cases (70) and controls (145)).

- Thesis student Sara Gudmonsdottir is currently working on a sub-study of the project including entering interviews data to data base for further analyses.
PhD study planned to be applied summer 2014:

A new Greenlandic birth cohort (ACCEPT):

A cross cooperation between Centre for Arctic Health, AU and Quinn Ingrid's Hospital, Nuuk and Coast District Hospital. Inst. Nurses and Health Scienses, Ilisimatusarfic (GRL-UNI), Nuuk.

- **Main aim:** Adaption to Climate Change, Environmental Pollution and Dietary Transition (ACCEPT): Establishment of a new prospective Greenlandic Cohort (2010-2015)

- **Focus:** Prospective Investigation of health effects upon climate & society changes affecting lifestyles and the diet intake

- **Study participants:** CAH. AU: prof. dr. Eva Bonefeld-Jørgensen & Co; Jon Øyvind Odland, NW; Suzanne Møller, Lise Hounsgaard (GRL-UNI) and midwives and bioanalyticals at the hospitals in GRL.

  - Interviews and sampling of blood, urine are ongoing in Nuuk, Sisimiut, Aasiaat, Qorqortoq and hopefully soon in Ilulissat

  - A sub-study are currently carried out by research year student Ane-Kerstin Knudsen & research ass. Lisbeth Kjeldsen including toxicological analyses, entering interviews and toxicological data to database for analyses of the first samples

- Telephone interviews of mother to children of 3 years are planned 2014 to evaluate the effect of lifestyle and diet intake (contaminants) on child development (a GRL medical student will perform the telephone interviews)

- Currently sampled approx. 300 mother-child pars (aim 600-800): The project will be a part of an international comparisons of birth cohorts in DK, Norway, China, Canada.
Thanks to all the collaborators

The Greenlandic BC team, Nuuk
Midwife Accept team, Nuuk.

ACCEPT co-coordinators
Suzanne, Lise, Jon Øyvind

The Ilulissat ACCEPT team
Team of Centre for Artic Health, AU

The Sisimiut ACCEPT team
The Aasiaat ACCEPT team
Thank for your attention

Return from Tasiilaq to Kulusuk, April 2013