



Department of Occupational  
Medicine and Public Health



# Faroese Environmental Health Research: past, present and future challenges and perspectives

Pál Weihe, MD

**The Faroese Hospital System**

**Sigmundargøta 5, P. O. Box 14, FO-110 Tórshavn, Faroe Islands**

**Tlf.: +298 31 66 96, Fax: +298 31 97 08, E-mail: [dfaa@health.fo](mailto:dfaa@health.fo)**



Faroe Islands: Pilot whales are taken for food, but cause exposures to methylmercury, PCB, etc.

# Why whales concentrate pollutants

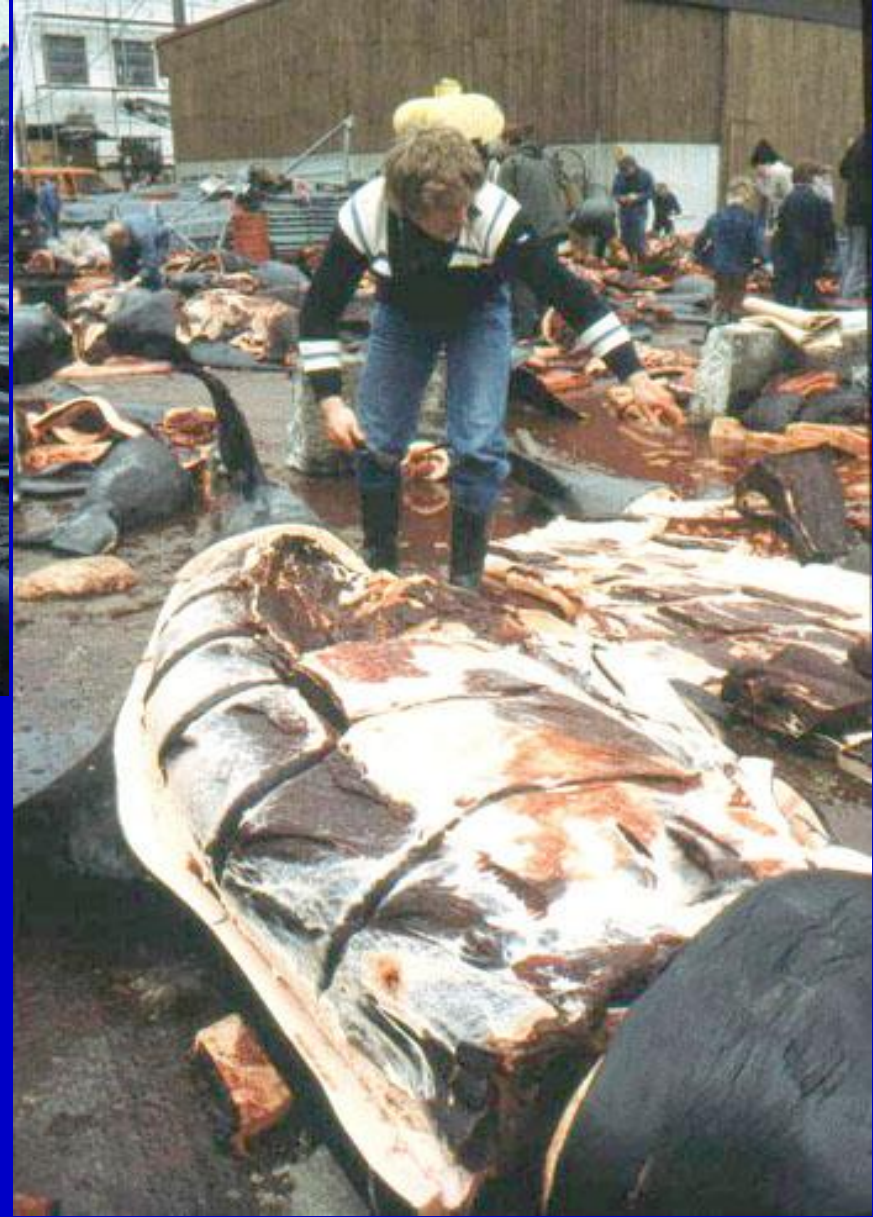
Long-lived and large, but accumulation of pollutants depends on food:

- 1) Baleen whales: feed on plankton and fish low in the food chains – less pollution
- 2) Toothed whales: feed on larger fish and squid higher up in the food chains - more pollution

# Whale contaminants – Human health concerns

- Mercury (methylmercury)
- Persistent organic pollutants (POPs):
  - Pesticides (DDT, Toxaphene, etc.)
  - Polychlorinated biphenyls (PCBs)
  - Other industrial chemicals (HCB, etc.)
  - Maritime pollutants (organotins, etc.)





Pilot whale intake causes mixed exposures:  
Methylmercury from meat,  
PCBs from blubber -  
Meat and blubber intakes vary independently

# Faroese diet 1981-82

## daily average intake per person

Source: Vestergaard & Zachariassen, Fróðskaparrit 1987

- Milk products: 390 g
- Meat: 68 g
- Fish: 72 g
- Vegetables: 224 g
- Bread: 215
- Meat from pilot whales: 12 g
- Blubber from pilot whales: 7 g

# Life expectancy 2011/12

- Female: 84.9 years
- Male: 79.1 years
- Total: 81.9 years

# Perinatal Mortality

(Source: Landslæknin)

	1981 /85	1986 /90	1991 /95	1996 /00	2001 /05	2006 /09	2011
Færøerne	13,3	10,6	9,0	6,1	4,0	6,4	3,4
Danmark	8,6	8,6	7,0	7,6	7,2	7,1	
Grønland	21,8	22,8	21,9	19,6	14,2	**) 16,2	
Island	6,8	6,8	5,2	5,7	3,6	3,5	
Norge	9,5	7,9	7,0	6,2	5,5	5,3	
Sverige	7,5	6,9	5,8	5,4	5	4,7	
Finland	7,5	6,4	5,7	5,8	5,2	4,5	
Åland	9,3	5	4,9	3,5	6,6	*) 3,7	



# Suicide

<b>Periode</b>	<b>Antal selvmord</b>
<b>1950-1979</b>	30
<b>1980-1989</b>	41
<b>1990-1999</b>	34
<b>2000-2009</b>	21
<b>2010-2011</b>	8

# Homicide

<b>Periode</b>	<b>Antal drab</b>
<b>1980-1989</b>	2
<b>1990-2009</b>	1*)
<b>2010-2011</b>	1**)

\* i 2005 udvidet selmord

\*\* i 2011 drab ifølge politi, dog uden at liget er fundet

# Alcohol and tobacco

- 24 % daily smokers
- 19 % daily smokers in 9. grade
- 6,4 liter alcohol per capita per year

# Life Satisfaction

- **Question:** Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?
- Faroe Islands scores 7,9 (Highest score)
- Also high scores in the isles north of Scotland – Island life is good for its people?
- Part of OECD Better Life /Gallup World Path

# Faroese birth cohort studies

- Total of ~2,300 mother-child pairs
- Focus on methylmercury and POP's
- Maternal exposure during pregnancy
- Neurobehavioral development
- Cardiovascular status
- Semen quality
- Immune function



# **Year of birth and number of children in each cohort**

1. 1986/87: 1023
2. 1994: 182
3. 1998/99: 650
4. 2000: 150
5. 2007/09: 500

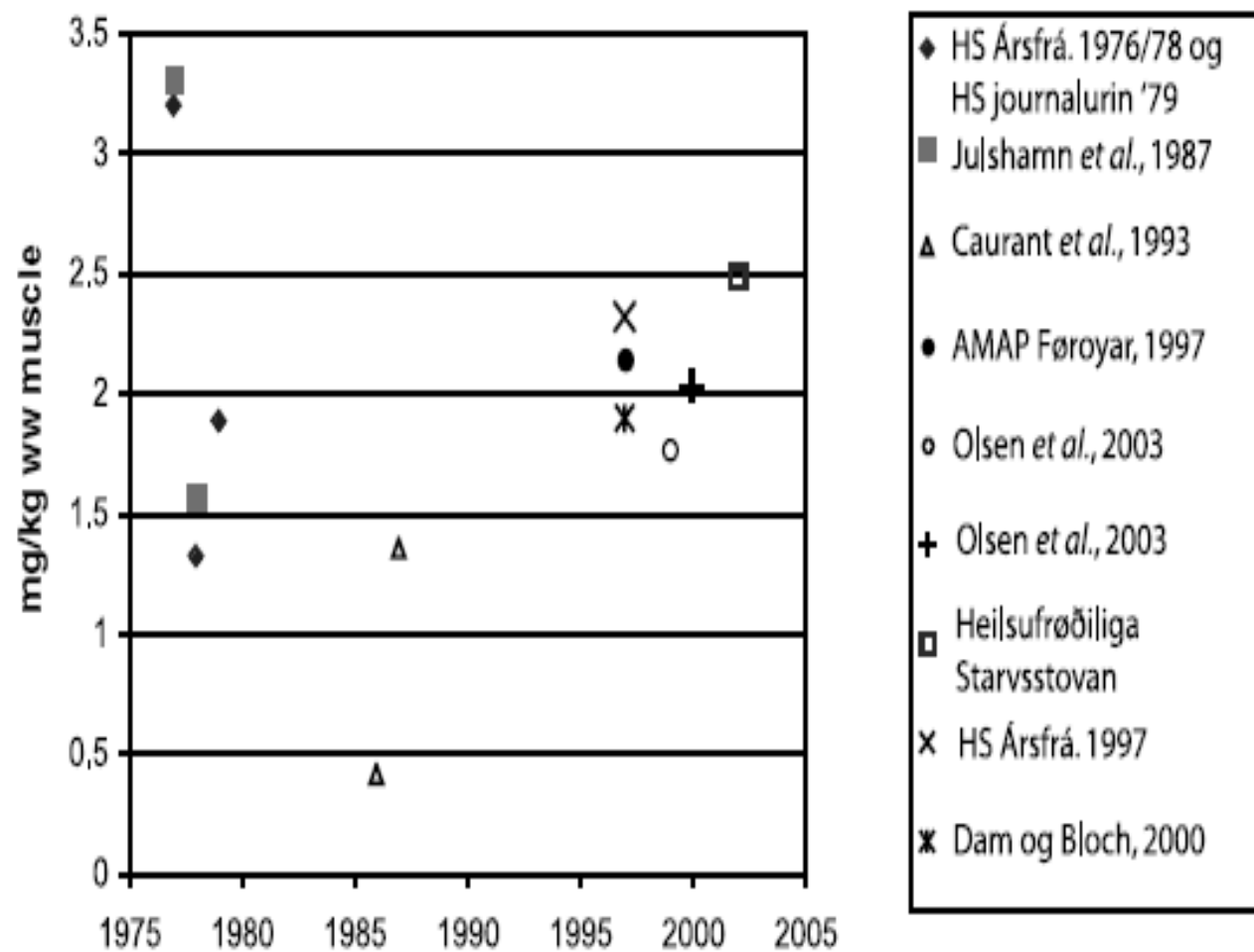
# Recommendation on pilot whale meat and blubber consumption

- First warning to the public in 1977
- Women in fertile age were recommended not to eat meat and blubber in 1998
- Health authorities recommended not to consume pilot whale any longer in 2008

# Faroese diet 2000-2001

## daily average intake per person (pregnant women)

- Milk products: 517 g
- Meat: 155 g
- Fish: 38 g
- Vegetables: 272 g
- Bread: 323
- Meat from pilot whales: 1,4 g
- Blubber from pilot whales: 0,6 g



*Fig. 15 Mercury in long-finned pilot whale muscle is shown, in mg/kg ww. The mean mercury for the sample pool has been calculated from the average distribution of muscle from males, females and young. (HS Ársfrág. 1976/78= HS Annual Report 1976/78; HS Journalurin =HS journal 1979-87 and 1987-89).*

*Total mercury in umbilical cord blood in Faroese cohorts in  $\mu\text{g/l}$*

<b>Cohort</b>	<b>Year</b>	<b>N</b>	<b>Geometric mean</b>	<b>Min.</b>	<b>Max.</b>
<b>Cohort 1</b>	<b>1986-87</b>	<b>894</b>	<b>22.9</b>	<b>0.90</b>	<b>351</b>
<b>Cohort 2</b>	<b>1994</b>	<b>163</b>	<b>20.9</b>	<b>1.90</b>	<b>102</b>
<b>Cohort 3</b>	<b>1998 -2000</b>	<b>603</b>	<b>12.3</b>	<b>1.60</b>	<b>193</b>
<b>Cohort 4 (mother-serum)</b>	<b>2000-2001</b>	<b>148</b>	<b>1,86</b>	<b>.001</b>	<b>7.50</b>
<b>Cohort 5</b>	<b>2007-2009</b>	<b>490</b>	<b>4.59</b>	<b>0.77</b>	<b>44.5</b>



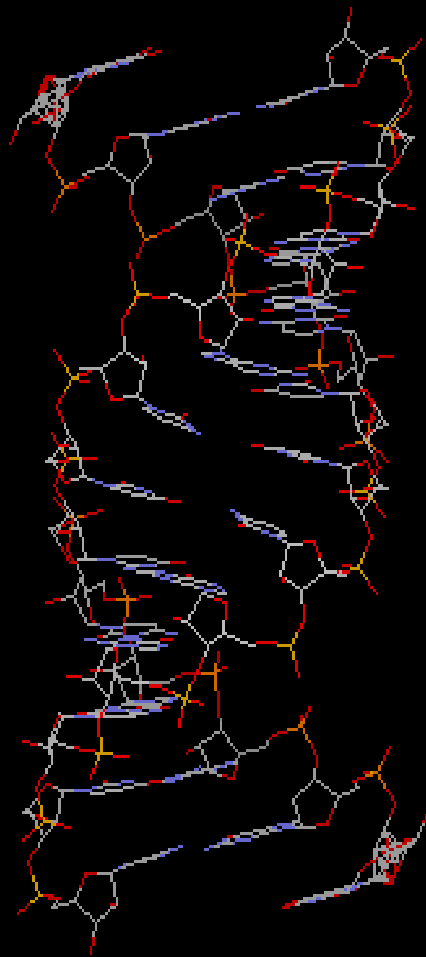
# Comparing Faroese cohorts

Cohort	Cohort 2 (1994-1995)	Cohort 3 (1998-2000)	Cohort 5 (2007-2009)
Serum $\Sigma$ PCB* ( $\mu\text{g/g}$ )	1.12 (0.62-1.87)	1.21 (0.80-1.81)	0.42 (0.25-0.78)
DDE ( $\mu\text{g/g}$ )	0.72 (0.4-1.21)	0.54 (0.34-0.94)	0.13 (0.07-0.29)
Mercury in cord blood ( $\mu\text{g/L}$ )	20.4 (11.8-40.0)	12.35 (7.07-20.81)	4.60 (3.02-6.74)
Mercury in maternal hair ( $\mu\text{g/g}$ )	4.08 (2.45-7.35)	2.14 (1.22-3.96)	0.70 (0.43-1.10)

\*sumPCB=(PCB 138+153+180)\*2  
Geometric mean (25-75%)

# Ongoing projects

- Type 2 diabetes and contaminants
- Immunsystem and contaminants
- Perflourinated compounds – sources
- Parkinson's disease – genetic components
- Semen quality in young men
- OECD – Better Life Initiative



# The Genetics Resource Centre

The Genetic Resource Centre is a governmental institution under the Ministry of Health, with a mandate to organize, develop and administer a Tissue Registry (biobank), a Diagnosis Registry and a Genealogy Registry and to process applications for permission to access and study the information contained in the mentioned registries.

# The FarGen Project

- To implement routine whole genome sequencing in health care for a whole society of 50,000 people
- To provide a cornerstone for optimal individualized health care with emphasis on prevention as well as treatment, cost effectiveness and democratic implementation
- To provide a foundation and resource for national and international research
- To develop a genomic health care model that has national and global compatibility
- To initiate a pilot study that explores the critical scientific, technical, ethical, legal and social aspects
- To create an infrastructure for long-term management, maintenance and evolution of the system



