The challenges of promoting local country foods while reducing Hg exposure during pregnancy in Nunavik

Women and mercury

HEJSupport webinar, June 17th 2020

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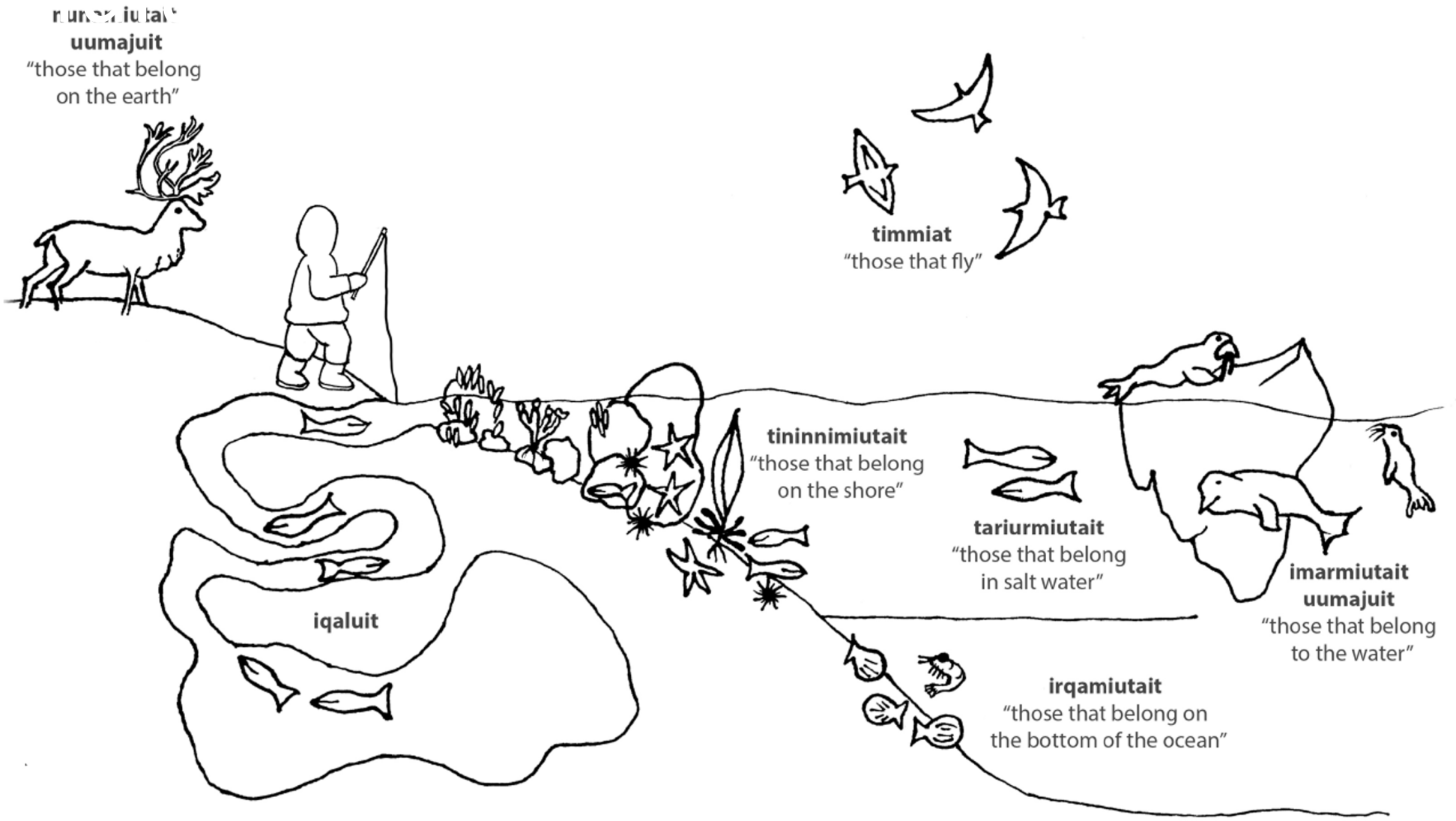
Food from the Ocean is central to



Rapinski et al. J of Ethnobiology 2018

COUNTRY FOODS FROM THE LAND, RIVERS AND THE SEA

Central to culture and… It tastes so good!

Foods from the land are real foods

Free of industrial food additives and packaging contaminants

All exceptional sources of nutrients

- ✓ Good fats and vitamins (omega-3, vit D, etc.)
- ✓ Essential elements (selenium, iron, etc.)

Some may accumulate environmental contaminants

- ✓ Persistent organic pollutants (PCBs)
- ✓ Mercury (Hg)
- ✓ Lead (Pb)

Global chemical production and climate change reaches the North and impact Indigenous and coastal's population health

Nearly 14,000 Companies in China Violate Pollution Rules

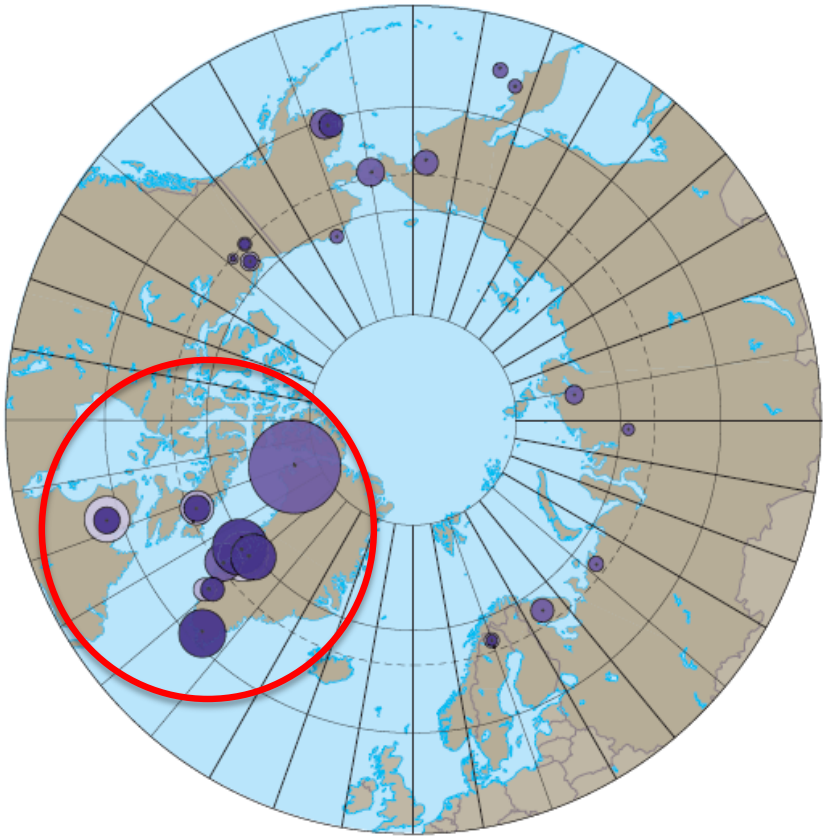
www.nytimes.com/2017/06/13/world/asia/china-companies-air-pollution-paris-agreement.html

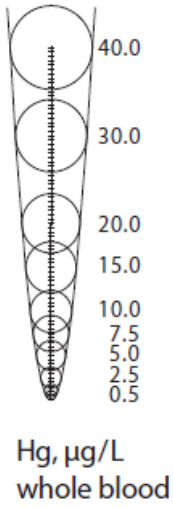
Inuit exposure to MERCURY is among the highest in the world

Basu et al. 2018

Arctic Monitoring and Assessment Programme

Arctic Climate Issues 2011





Women of chilbearing-age with blood mercury above the Health Canada Guideline (8 µg/L)

53% in Nunavik in 2004

43% in Nunavut in 2007-2008

2% in the Canadian general population (CHMS, Cycle 1 2007-09)

Legrand et al. 2010; Lemire et al, 2015; Chan and Nunavut Steering Committee of the International Polar Year Inuit Health Survey, 2012; Lye al, 2013

Percentage of women of child-bearing age with blood mercury above the Health Canada Guideline

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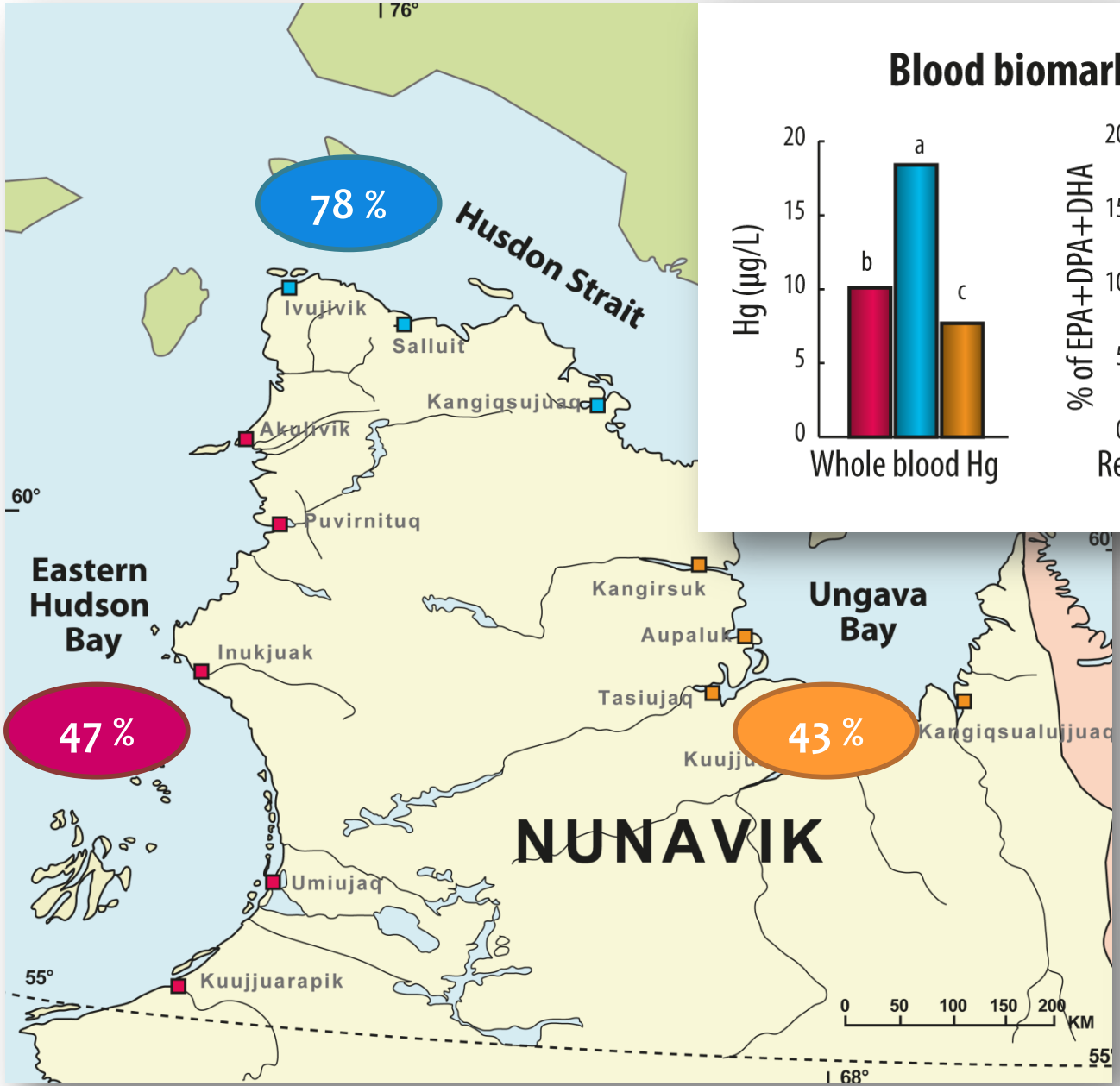
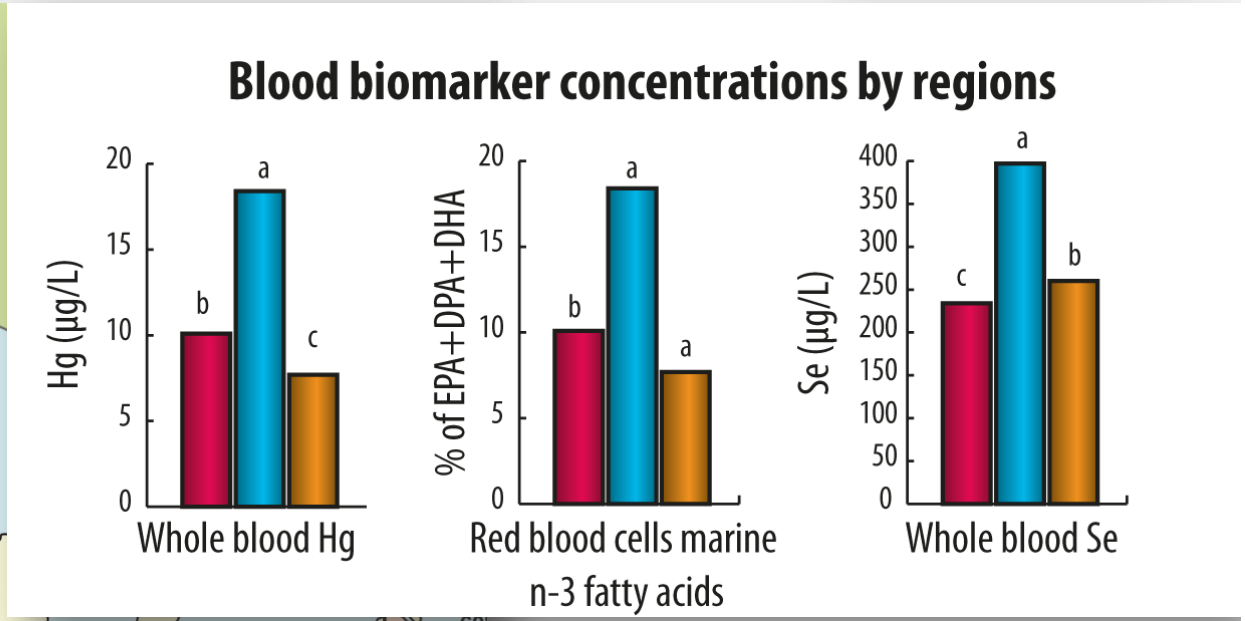


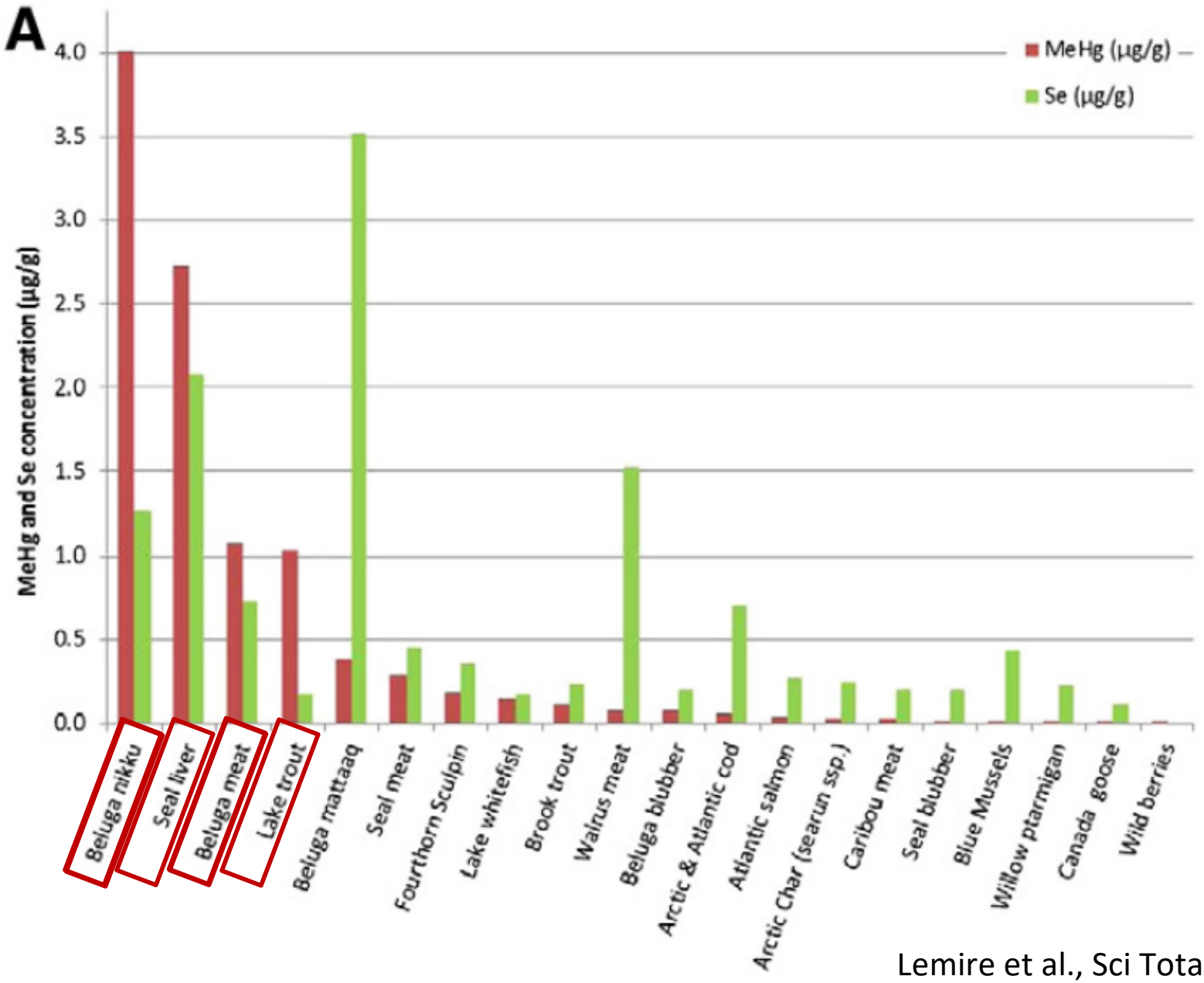


Nunavik regions

- Eastern Hudson Bay: Kuujjuaraapik, Umiujaq, Inukjuak, Akulivik
- Husdon Strait: Ivujivik, Salluit, Kangiqsujuaq, Quartaq
- Ungava Bay: Kangirsuk, Aupaluk, Tasiujaq, Kujjuaq, Kangiqsualujjuaq

Lemire et al, Sci Total Environ. 2015; Lye et al, CJPH, 2013

Mercury and selenium in Nunavik country foods



Lemire et al., Sci Total Environ. 2015.

Health effects of mercury (Hg)

Alterations associated with chronic, low-level blood Hg exposure (< 200 µg/L or < 1000 nmol/L) - Based on health studies in Nunavik -	
Children (Nunavik Child Development Study)	
Prenatal exposure	• Shortened gestation/prematurity • Later in childhood: ○ Impairments in: intellectual per lang processing of visuo-spatial and sensory info ○ Incr hyp
Postnatal exposure	• Altered fine motor functions • Decreas
Adults (2004 Qanuippitaa N	
Adult exposure	• Elevated blood pressure and decreased heart rate variability • Lower paraoxonase 1 (PON 1) activity

Maternal blood
< 44 µgL (220 nmol/L)

Mercury have a short half-life of ≈ 50 days
All stages of pregnancy are vulnerable to Hg exposure

Chronic versus bolus Hg exposure seems to have similar deleterious impact on fœtal development

Lemire et al, NRBHSS, in revision; Pirkle, Muckle and Lemire, CMAJ, 2016; Sakamoto et al, 2017

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RÉGIE RÉGIONALE DE LA NUNAVIK REGIONAL
SANTÉ ET DES SERVICES BOARD OF HEALTH
SOCIAUX DU NUNAVIK AND SOCIAL SERVICES

BLOOD MERCURY (Hg)

Clinical interventions in Nunavik according to blood levels

Women / adolescents who are pregnant or planning a pregnancy during the year
Children ≤ 11 years

Total blood Hg
< 40 nmol/L
No follow-up required

Total blood Hg ≥ 40 nmol/L

1. If the **investigative questionnaire** has never been completed, fill it out with the patient, file it with his or her record and forward it to the Nunavik Department of Public Health.
2. If no **MeHg test** has been performed until now, ask the laboratory to perform the test on the specimen provided **(Note 1).**
3. If **micronutrient deficiencies** are of concern (for example, iron deficiency) treat according to the clinical protocol in effect and refer to the nutrition clinic, if available **(Note2).**

Exposure to inorganic source (Note 1)

Inorganic Hg

4. Contact the **Québec anti-poison centre.**
5. Inform the **Nunavik Department of Public Health**, which will identify the appropriate interventions (physician on duty or Dr. Mario Brisson at 418 666-7000 #335).

Exposure to proven or probable food source (Notes 1, 3)

Total blood Hg :
40 à < 200 nmol/L

4. **Immediately provide nutrition advices** in view of reducing exposure (see box #1 and pamphlet).
5. Repeat the **blood test two (2) months** after the counselling.

Total blood Hg :
200 à < 500 nmol/L

4. **Immediately provide nutrition advices** in view of reducing exposure (see box #1 and pamphlet).
5. Repeat the **blood test two (2) months** after the counselling.
6. For pregnant women / adolescents:
   - **check on application of advices** one (1) month after the last counselling and repeat as needed;
   - consult the **Centre IMAGe**, as needed **(Note 4)**.

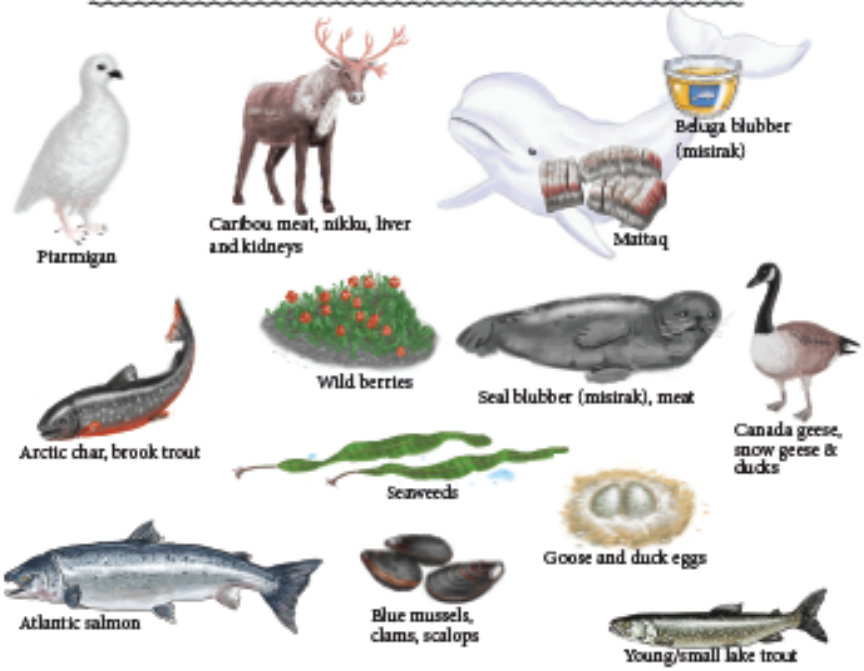
Total blood Hg ≥ 500 nmol/L

4. **Immediately provide nutrition advices** in view of reducing exposure (see box #1 and pamphlet).
5. Repeat the **blood test two (2) months** after the counselling.
6. For pregnant women / adolescents:
   - **check on application of advices** one (1) month after the last counselling and repeat as needed;
   - consult the **Centre IMAGe (Note 4).**
7. If accompanied by **signs or symptoms compatible** with exposure to mercury **(Note 5):**
   - fill out the ***MADO* reporting form** and return it to the Nunavik Department of Public Health **(Note 6);**
   - refer to a specialist (toxicologist or neurologist).
8. Contact the **Nunavik Department of Public Health** (physician on duty or Dr. Mario Brisson at 418 666-7000 #335).

A health professional tells you that the level of mercury in your blood is high. What can you do?

1. **Eat as much as possible** country foods containing little or no mercury. Most country foods in Nunavik fall under this category.

Country foods containing little or no mercury



LOW MERCURY LEVEL

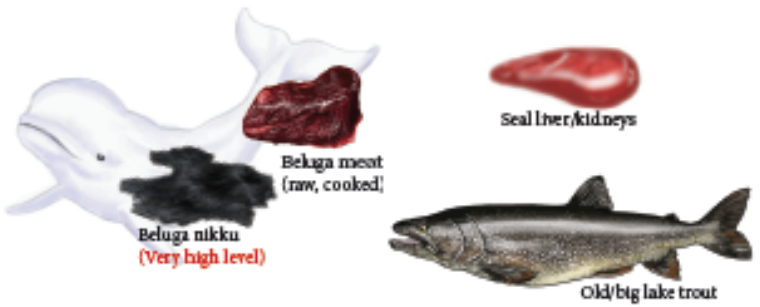
Marine mammals: Beluga blubber (mistrak) • Seal blubber (mistrak) • Walrus blubber, meat, liver and kidneys • Polar bear meat • Fish: Arctic Char • Brook trout • Atlantic salmon • Arctic and Atlantic cod • Lake whitefish • Fourhorn sculpin (Ugly fish) • Fish eggs • Molluscs : Blue mussels • Clams • Scallops • Wildfowl : Willow ptarmigan • Canada & snow geese • Canada goose eggs • Scoter, eider and other ducks • Mammals : Caribou meat and nikku • Muskox meat • Snowshoe hare meat • Plants : Wild berries • Seaweeds

LOW – MODERATE MERCURY LEVEL

Marine mammals : Beluga mattaq (skin and blubber) • Seal meat • Fish: Young / small lake trout • Burbot
Wildfowl : Eider eggs • Sea/herring gull eggs
Mammals : Caribou liver and kidneys • Muskox liver and kidneys

2. **Only eat** country foods with high mercury levels according to the **recommended frequency.**

Country foods containing high mercury levels[1]



If you have a high mercury level in your blood and you are...

A baby[2] or a child less than 11 years old →
- Avoid eating beluga nikku
- Total maximum of 1 time/month[3]: Beluga meat (raw, cooked), seal liver/kidneys or old/big lake trout

A woman /adolescent who is pregnant[4] or planning a pregnancy during the year →
- Avoid eating beluga nikku
- Total maximum of 2 times/month[3]: Beluga meat (raw, cooked), seal liver/kidneys or old/big lake trout

Another adult or a child over 12 years old →
- Maximum of 2 times/month : Beluga nikku
- Total maximum of 4 times/month[3]: Beluga meat (raw, cooked), seal liver/kidneys or old/big lake trout

1. Also includes these less consumed country foods : beluga liver/kidneys, northern pike, common loon, herring/sea gull.
2. Breast milk is safe and is strongly recommended.
3. You should add the total number of times per month you eat country foods containing high mercury levels. For example, if a pregnant woman with a high blood mercury level eats beluga meat once in a month, she should not eat old/big lake trout more than once that same month for a total recommended maximum of 2 times a month.
4. While liver is an excellent source of iron, it is not recommended for pregnant women because of its excessively high levels of vitamin A.

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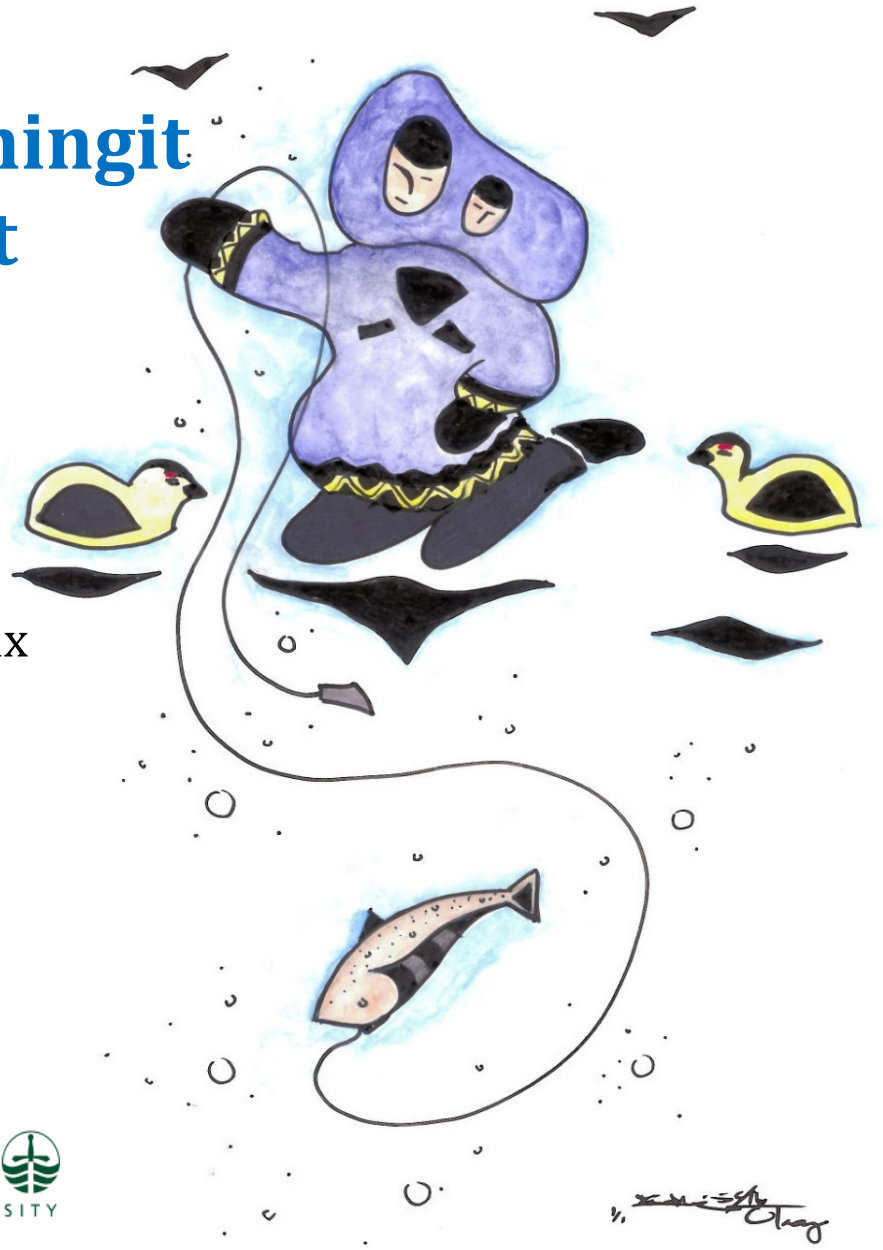
Pregnancy wellness
with country foods

Grossesses en santé
avec les aliments locaux

2016 - ...



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Dominique Hamel
Gina Muckle
Catherine Pirkle
Amanda Boyd
Chris Furgal

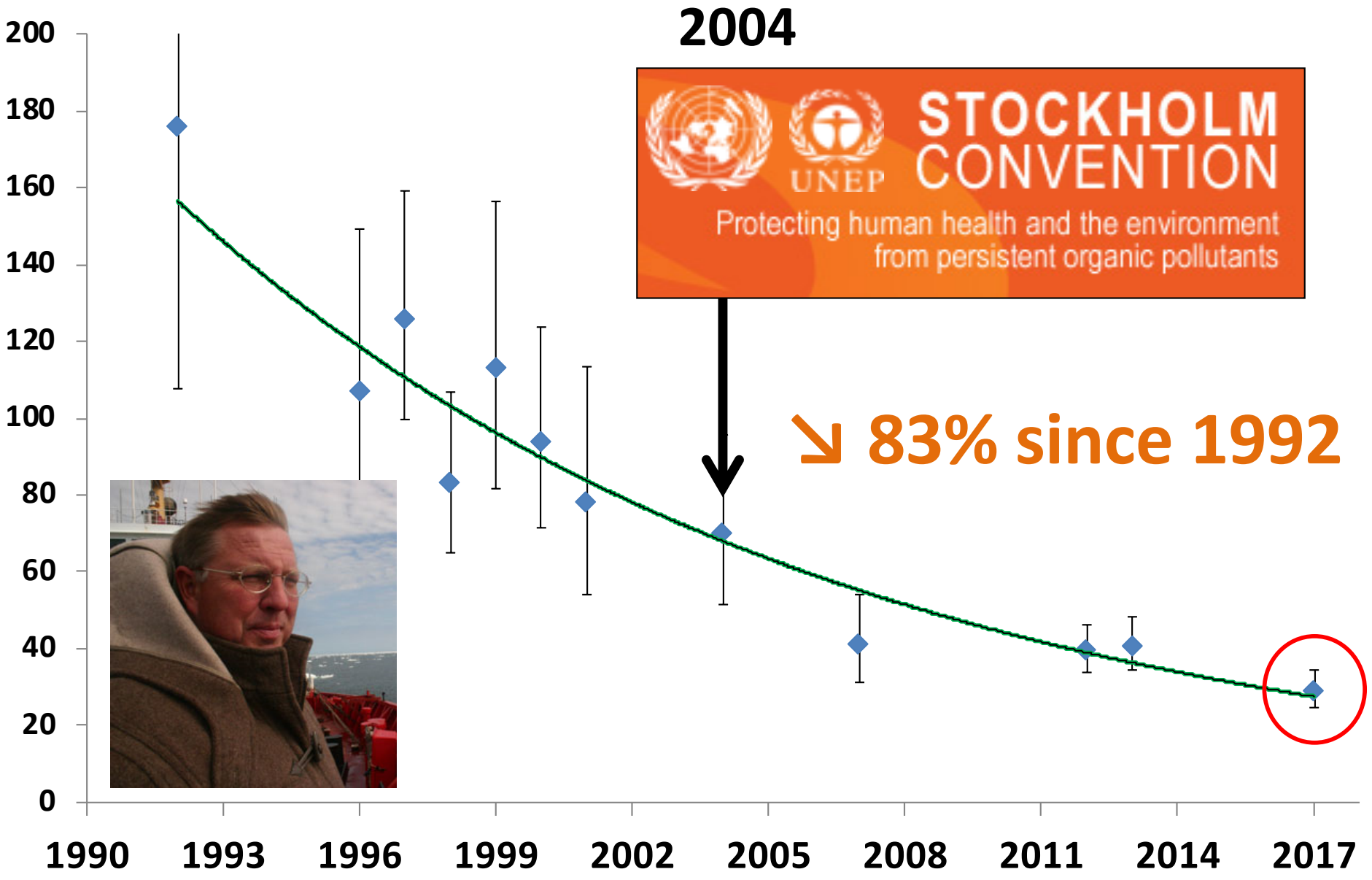
25 ANS YEARS
Programme de lutte contre les contaminants dans le Nord
Northern Contaminants Program

Number of pregnant women eligible and recruited in Nunavik between October 2016 to March 2017

Village	Number of pregnant women eligible (estimated)	Number of pregnant women recruited	% of participation *
Hudson Bay region	99	38	38
Hudson Strait region	77	37	48
Ungava region	55	22	40
TOTAL	231	97	42

* Participants were not selected on a random basis but using as a convenience sample

Serum PCB 153 (µg/kg lipids)



Summer 2017

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Lettre ouverte
Open Letter

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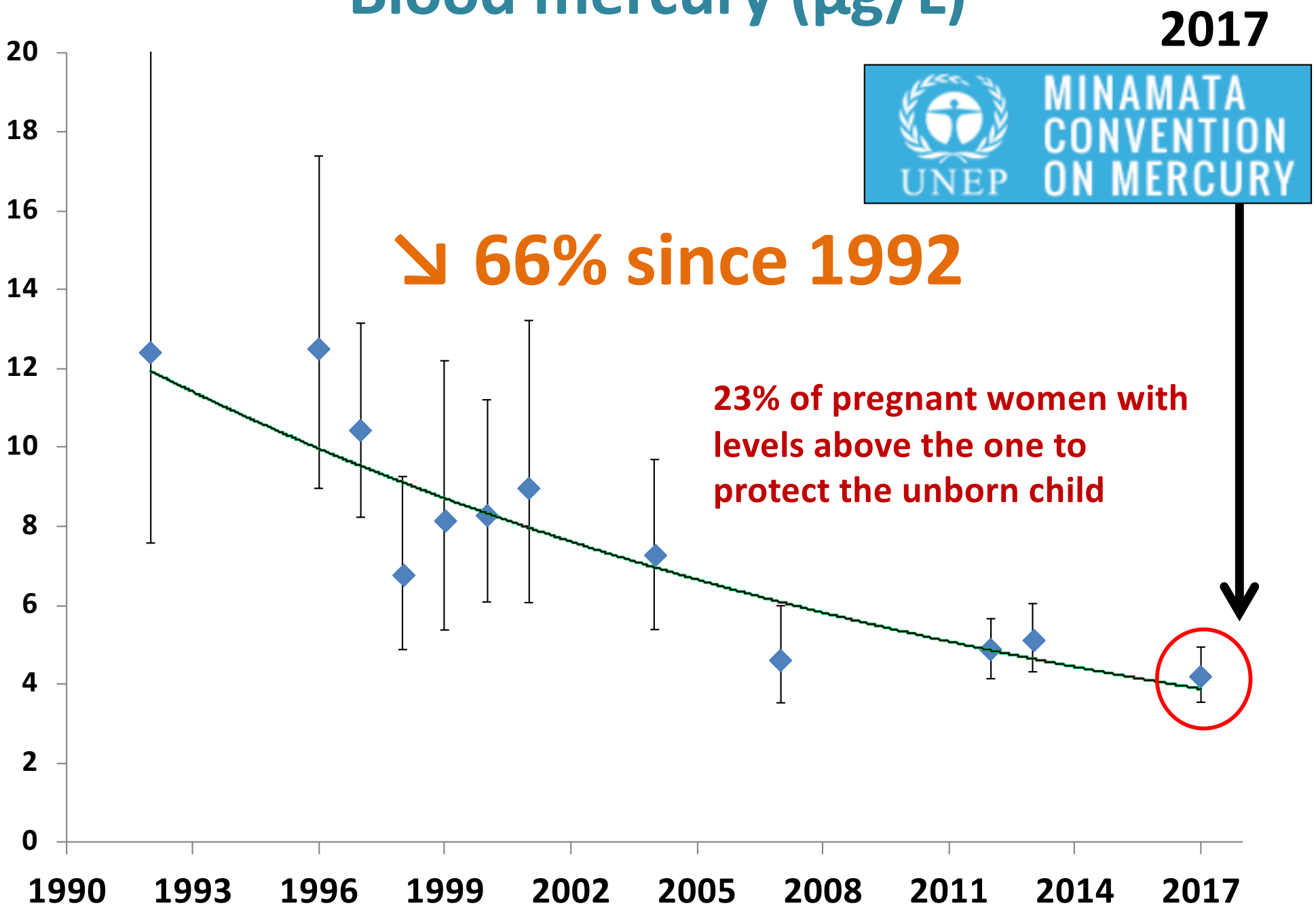
MERCI À VOUS, NUNAVIMMIUT, POUR VOTRE PRÉCIEUSE COLLABORATION!

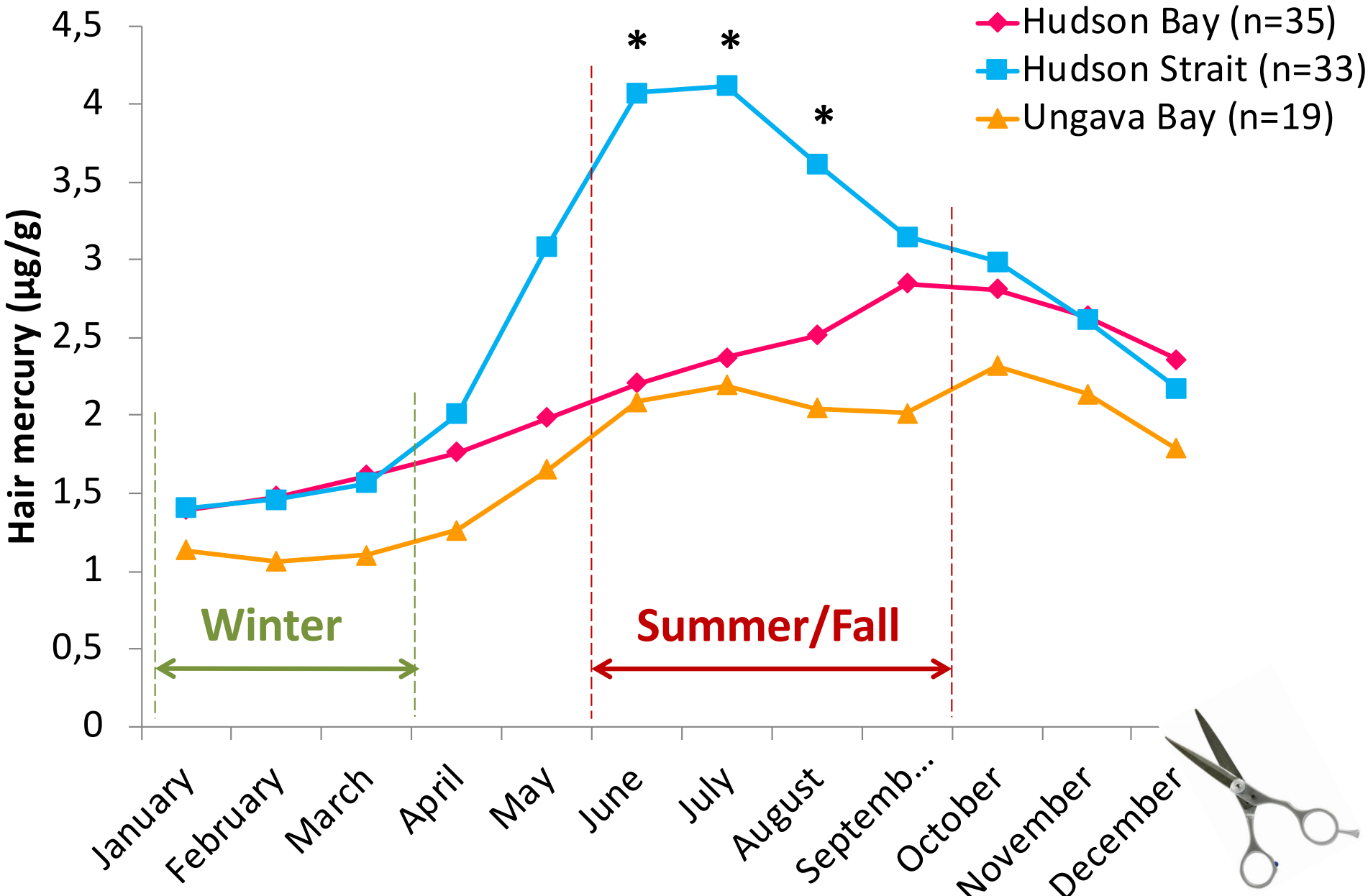
THANK YOU NUNAVIMMIUT FOR YOUR INVALUABLE COLLABORATION!

ᐊᑦᕋᐊᑦ **30** ᐊᓂᔪᓕᓕᐊᑎᓐᓂᑐᑦ, 3,000 ᐅᖃᓪᓚᑦᑐᑦ ᓄᓇᕗᒻᒥᐅᑦ ᐃᓕᐅᖃᑦᑕᓯᒪᔪᑦ ᖃᐅᔨᓴᐃᑎᓄᑦ ᓄᓇᔪᒍᐅᓯᒪᓕᕆᓂᖅᓴᖅ ᐊᓯᔪᓄᑦ ᐊᑐᕐᓇᖅᑐᓂᖅᓴᖅᓱᓂᖅᓴᖅ (POP-ᓴᖅ), ᐊᒻᒪᓗ ᒪᐃᑉᐸᖅ ᐱᓕᕆᔨᒃᑯᑦ ᐊᐅᓚᑦᑎᓂᖅᓴᖅ. ᑕᒪᐃᔨᑦ ᖃᐅᔨᓴᐃᑎᓄᑦ ᐊᑐᖅᑕᐅᓂᖅᓴᖅ, ᐊᓂᒍᖅᑕᐅᓂᖅᓴᖅ ᐊᔪᖅᑐᕐᓇᖅᑐᓂᖅᓴᖅ ᑎᑎᕋᐅᓂᖅᓴᖅ ᐊᑐᖅᑕᐅᓂᖅᓴᖅ, ᐊᑐᖅᑕᐅᓂᖅᓴᖅ ᐊᑐᖅᑕᐅᓂᖅᓴᖅ ᐊᑐᖅᑕᐅᓂᖅᓴᖅ

Blood mercury (µg/L)

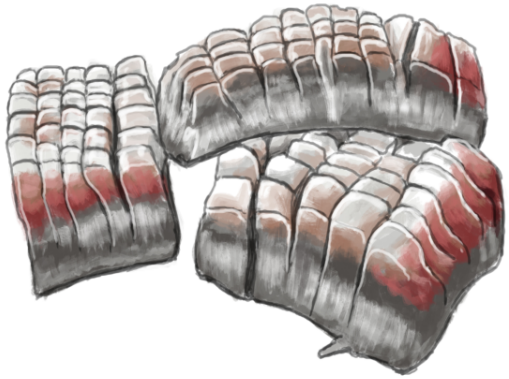


Hair mercury by month (µg/g)



Pontual et al, submitted

Beluga mattaaq versus beluga meat ?



VERY HIGH in selenium and selenoneine and NOT very high in mercury (0.3 µg/g)

HIGH in mercury (1 µg/g)

VERY HIGH in mercury (4 µg/g)

VERY HIGH in good fats, vit A & D
Low in selenoneine
Low in mercury
Older contaminants like PCBs are decreas

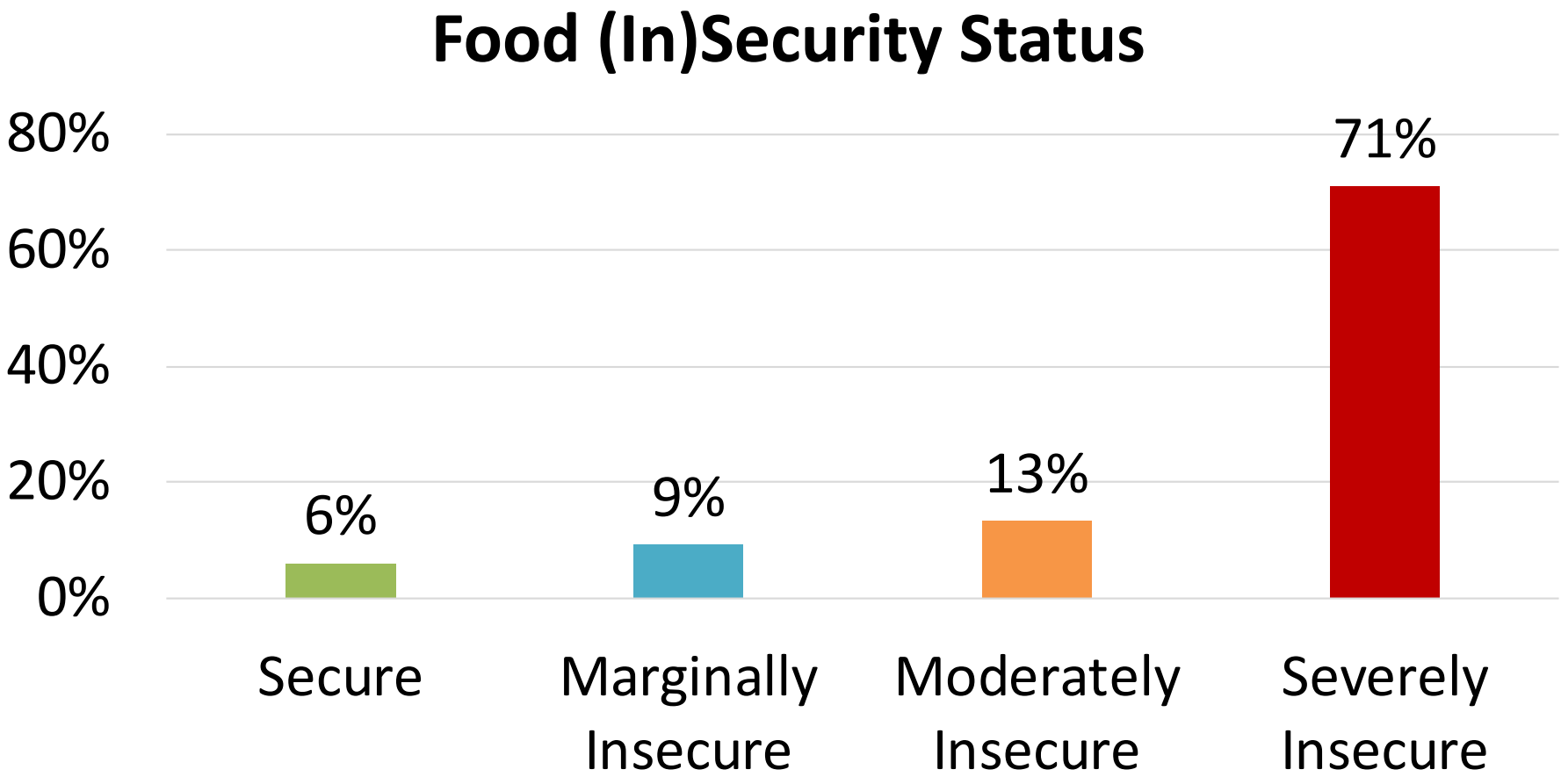
Most other country foods in Nunavik are low in mercury

Prevalence of iron deficiency and anemia

- **Iron deficiency:** 79%
- **Anemia:** 37%
- Severity:
    - **Mild anemia:** 25%
    - Moderate/severe anemia: 12%
  - Classification:
    - **Iron deficiency anemia:** 33%
    - Unexplained anemia : 4%

Country foods are an EXCELLENT source of iron

Food (In)Security Classification (HFIAS)



Total Food Secure: 6%

Total Food Insecure: 94%

Have you heard any of the following advice or messages ?

	Yes	No	Don't know
Country foods are a good source of healthy fats	78 %	19 %	3 %
Generally, eating country foods is good for pregnant women	90 %	8 %	2 %
Generally, eating country foods is good for a developing foetus (the baby developing inside the mother)	85 %	9 %	6 %
Pregnant women should reduce the amount of beluga meat they eat	36 %	57 %	7 %
Hunters should avoid the use of lead shot for hunting	16 %	69 %	14 %

What can we do now?

- **Environmental contaminants in the Arctic are :**
  - **An Environmental Injustice**
  - **A threat to Indigenous Rights to Healthy Foods**
- **Inuit have the right to know and to make informed decision for healthy pregnancies and children**
- **There is evidence that targeted dietary counselling can reduce exposure to mercury and toxic effects on child development**

- **International and federal level:**
  - **Monitor and ban new harmful chemicals**

AMAP Arctic Monitoring and Assessment Programme

INUIT

Société Makivik
Makivik Corporation

RÉGIE RÉGIONALE DE LA SANTÉ ET DES SERVICES SOCIAUX DU NUNAVIK
NUNAVIK REGIONAL BOARD OF HEALTH AND SOCIAL SERVICES

NUNAVIK NUTRITION & HEALTH COMMITTEE
COMITÉ NUTRITION ET SANTÉ DU NUNAVIK

Our Goal

Find a solution to promote country foods while avoiding exposure to Hg and lead

What are we doing now ?

With the Nunavik Regional Board of Health and Social Services, we are realizing a series of **consultations** in 2019-2020

- **Other knowledge about country foods during pregnancy?**
- **How can we make sure pregnant women have enough to eat?**
- **How can we work together to promote country foods while avoiding mercury and lead?**
- **Who should receive the information? How?**
- **How can se support midwifes in their work and develop integrated messages on country foods?**
  - Inuit culture
  - Midwifes' and grandmothers recommendations
  - Mercury and lead
  - Toxoplasmosis
  - Iron intake and anemia
  - Food security

- Additional country food analyses
- Clinical asessment of pregnant women Hg and Pb exposure

NEWS 18 NOVEMBER, 2019 – 1:00 PM EST

Quaqtaq protests beluga harvest quota

"We now know a lot about theses issues, we need to start taking action"

Regional Climate Change Adaptation Planning workshop
Kuujjuaq, November 20th, 2019

Students from Isummasaqvik School in Quaqtaq joined a protest on the morning of Friday, Nov. 15 at the community's shore, against the federal Department of Fisheries and Oceans' beluga harvest quotas, which has long been controversial in Nunavik. Protesters mobilized on Facebook and posted photos and video from the day that show more than 20 people congregating. One protester's sign reads: Quotas=Hunger, Belugas=Food Security, Beluga Hunt=Community. (Courtesy Mae Tukkiapik Aloupa)

LITTORAL

CHAIRE DE RECHERCHE EN PARTENARIAT SENTINELLE NORD EN APPROCHES ÉCOSYSTÉMIQUES DE LA SANTÉ

SENTINEL NORTH PARTNERSHIP RESEARCH CHAIR IN ECOSYSTEM APPROACHES TO HEALTH

UNIVERSITÉ LAVAL

CHU de Québec Université Laval

Centre de recherche

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