Pathogens and heavy metals in harvested Ringed Seals in Iqaluit, NU

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Background

The nattiq, or Ringed seal (*Pusa hispida*) is a very important contributor to the diets of the Inuit people, such as on Baffin Island. The abundance of seals, their nutritional value, and high costs of other food sources in the north keep this cultural practice thriving. This region is currently experiencing rapid environmental changes, particularly associated with climate change, such as the movement of wildlife pathogens from southern regions. This movement of pathogens has been associated with the northward movement of other seal species, which are moving north with the continually receding ice, and has already been observed in northern Europe, Greenland, and Canada.

The goal of this project is to get a picture of the current health status of the nattiq population in Frobisher Bay, Nunavut, through close collaboration between project investigators and community members. Specifically, this project includes three aims:

- **Aim 1: To identify current concerns of Iqaluit community members related to Ringed seal health.**
- **Aim 2: Determine levels of four heavy metals (total arsenic, cadmium, lead, total mercury) in harvested ringed seal muscle and liver.**
- **Aim 3: Determine the level of exposure in harvested ringed seals to some infectious agents.**

Methods

IQ

- 9 semi-structured questions
- 10 interviews with local hunters and elders
- Hunters are over 18, and experienced in Iqaluit waters
- Selection from local HTA, and community referral system, and involvement with local hunting programs

Heavy Metals

- From 47 harvested Ringed Seals
- Two tissue types: Liver and muscle
- All tissues frozen upon collection until analysis
- Determination of 4 heavy metals and 15 trace elements

Pathogens

- From 44 harvested Ringed Seals
- Blood samples were collected immediately
- Serum separated and frozen until analysis
- Trichinella testing on digested tongue and diaphragm
- Antibody levels measured and interpreted based on standard animal tests

Results and Discussion

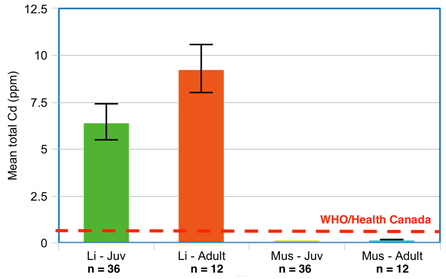

Fig. 1. Mean total cadmium levels in muscle and liver of harvested Ringed Seals. Dashed line represent the WHO/Health Canada guidelines for safe consumption.

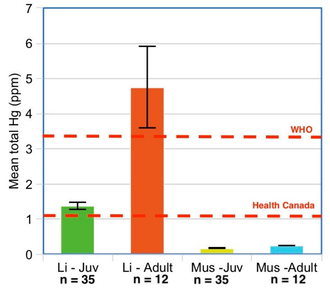

Fig. 2. Mean total mercury levels in muscle and liver of harvested Ringed Seals. Dashed lines represent the WHO and Health Canada guidelines for safe consumption.

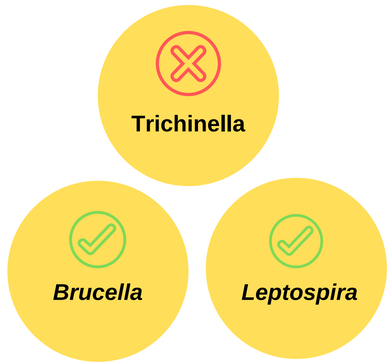

Table 1. Serology of harvested ringed seals. Brucella: number of positives on card test. Leptospira: They were considered positive if titres were 1:800 and above.

	Juvenile (n=29)	Adult (n=8)
B. canis	0	0
B. abortus	6	1
L. bratislava	1	0
L. canicola	0	0
L. grippotyphosa	0	0
L. hardjo	0	0
L. icteroheamorragiae	9	1
L. pomona	1	0

Heavy Metals

- Total mercury (Hg) and cadmium (Cd) levels were high for liver based on WHO and Health Canada guidelines (WHO, 2007; HC, 2018),
- Based on the literature, between 2-4% of this total Hg is in the form of methylmercury,
- The remaining 96-98% is in the form of inorganic Hg (Wagemann et al., 1998; Wagemann et al., 2000; Braune et al., 2015).

Pathogens

- No trichinella was found in ringed seal tissues (diaphragm and tongue).

Inuit Qaujimajatuqangit

- Hunters prefer young seals over older/larger seals when out hunting,
- Seals have not declined in number, but have moved further away from the city of Iqaluit,
- Hunters judge the health of ringed seals through quality of meat, fur, organs, and behaviour,
- Hunters have not noticed an increase in number of sick ringed seals over time.

Conclusion

- Harvested ringed seals in Iqaluit are healthy.
- Further analyses of different mercury forms must be considered.
- Hunter inspections are efficient in judging health of harvested seals.
- Risk assessment must weight the positive aspects of ringed seal consumption along with the risks.

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